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The SEAMAN's

Daily Assistant,

BEING

A Short, Easy, and Plain Method

OF KEEPING

A JOURNAL at SEA;

In which are Contain'd

RULES,

SHEWING

How the Allowances for Lee-way, Variation, Heave of the Sea, Set of Currents, &c. are to be made; and to Correct the Dead-Reckoning by an Observation, in all Cases: And also all the TABLES that are any ways necessary for the SEAMAN's Use in keeping a Journal.

By THOMAS HASELDEN,

Late Teacher of the MATHEMATICKS in the *ROYAL-NAVY.*

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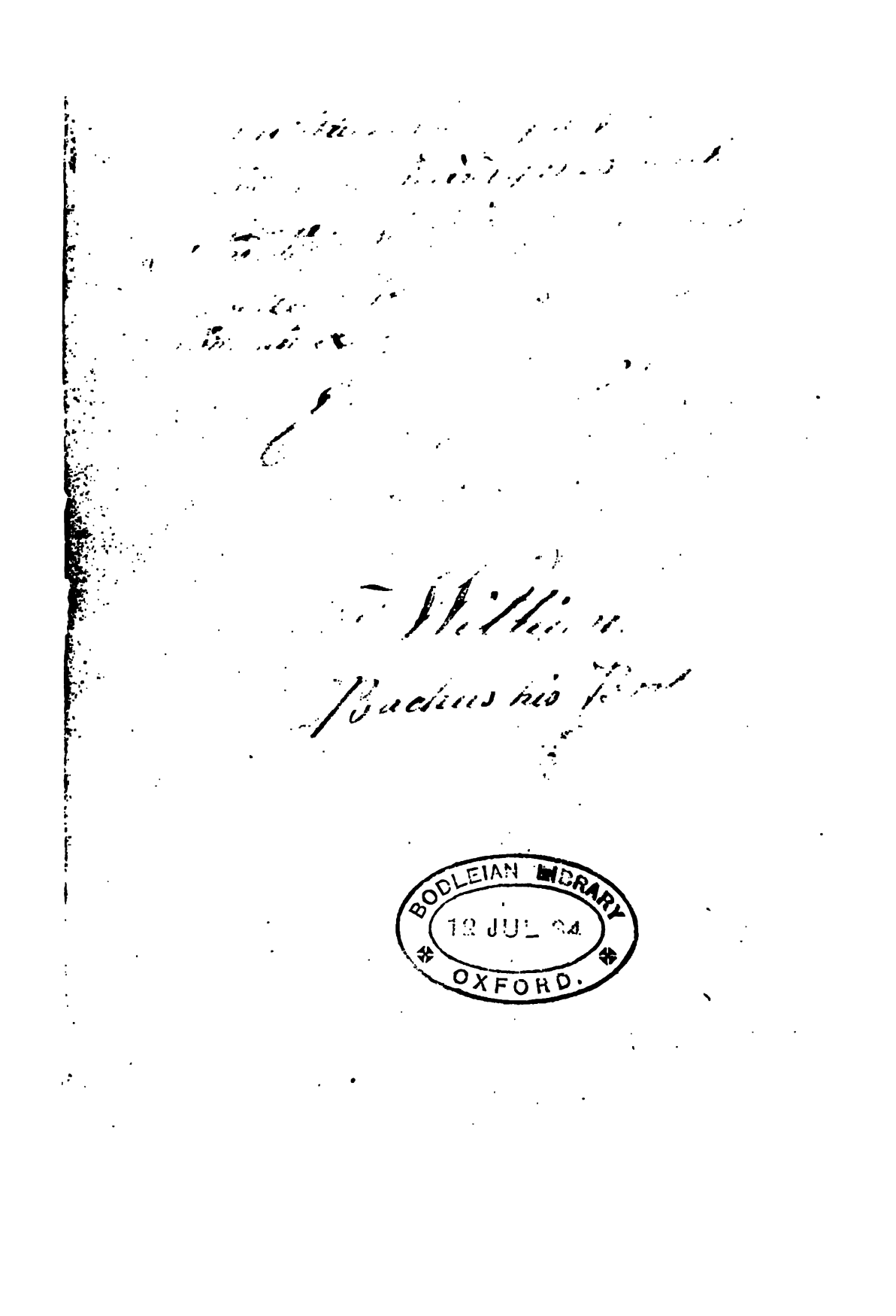
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TO THE
READER.

HAVING been Educated in the Theory of Navigation, almoſt from my Childhood, and having had about Sixteen Years Experience of the practical Part (at Sea) both in the Merchant Service, and alſo as Teacher of the Mathematicks in the Royal-Navy; and having in the Courſe of that Time made a general Obſervation, that there are Numbers of Seamen who would gladly keep a Reckoning, had they any Short, Eaſy and Plain Method to do it by, but are deterr'd from it by the want of ſuch a Thing: And alſo that there are many who have thrown their Money away to little or no purpoſe, by going to School to ſome Maſters (of which Sort there are too many) that have only got a Smattering of the Theory, and a few Terms of Art by Rote, which enables them to talk in ſuch a manner as to deceive thoſe that go to learn of them; but having never been at Sea, cannot know any Thing of the Practice.

Therefore for the Uſe of ſuch in particular, and of all other Seafaring Men in general, I have Written the following Treatiſe, in which I think I have inſerted all the Rules, and all the Tables with their Uſes, that are neceſſary to be uſed in any Caſe at Sea: And alſo particular Rules for keeping a Journal, with the manner of Correcting the Dead-Reckoning by an Obſervation, either for one Day, or for a longer Time; the firſt of which, viz. Correcting for one Day, has been treated of by ſeveral Authors; but the latter, viz. Correcting for a longer Time, I know has been barely mentioned in ſeveral, but not particularly explain'd in any Author at all I believe, at leaſt in none that I have

To the READER.

Read; And for that Reaſon I have done it in the Journal at the latter end of this Book, it being abſolutely neceſſary for every Man that keeps a Reckoning to know it, becauſe they are more likely to be out in their Reckoning, when they have been ſome Days without an Obſervation, then when they have one every Day, and conſequently more likely to have Occaſion to correct for three or four Days, than for a ſingle One.

I have not begun this Book with Arithmetic, as moſt of the Books on this Subject do, becauſe I think, that if any Perſon has had ſo little Education as not to be capable of Adding, Subtracting, Multiplying and Dividing, he will hardly be able to make any Progreſs, either in Arithmetic or Navigation, by the help of Books alone, without the Aſſiſtance of a Maſter (ſo that I think putting ſuch Things into Books of this kind, ſerve only to enhance the Price, and are of no Service to the Reader.) And now having given an Account of the Reaſons that enduced me to publiſh this Book (which I hope, and am pretty well aſſured, will be found the moſt uſeful Book of its kind, now in Print) for the Daily Practice at Sea, I have nothing more to add, but to beg the Readers kind Acceptance of my Endeavours,

And am,

Their humble Servant,

Thomas Haſelden.

THE

THE

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Note, All the aforementioned Tables are newly and carefully calculated, and the Tables of Latitude and Longitude carefully corrected from the beſt Authors and Charts.

A

TABLE

OF

DIFFERENCE of LATITUDE

AND

DEPARTURE

To every Single DEGREE,

And as far as 300 Miles DISTANCE.

William Bachus his Sonnan[illegible]
[illegible] Sumes In Sin Lil Sins
Jon Son Ro Good und Chawing Jaseom
Prisoner He Will neom Be Wise that
God Counch deshyes He Ill Thbom
He that hates Lurneu Is a fool
Demonsuation is the [illegible]
Demonsuation Nthe Lost Nonsin
or In Strnchtion William
Holcum
He that hats Lurning Is a
Lool He Ill neve

Difference of Latitude and Departure for 1 Deg. 1

Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep
1	01.0	00.0	51	51.0	00.9	101	101.0	01.8	151	151.0	02.6	201	201.0	03.5	251	251.0	04.3
2	02.0	00.0	52	52.0	00.9	02	102.0	01.8	52	152.0	02.6	02	202.0	03.5	52	252.0	04.3
3	03.0	00.1	53	53.0	00.9	03	103.0	01.8	53	153.0	02.6	03	203.0	03.5	53	253.0	04.3
4	04.0	00.1	54	54.0	00.9	04	104.0	01.8	54	154.0	02.7	04	204.0	03.5	54	254.0	04.4
5	05.0	00.1	55	55.0	01.0	05	105.0	01.8	55	155.0	02.7	05	205.0	03.5	55	255.0	04.4
6	06.0	00.1	56	56.0	01.0	106	106.0	01.8	156	156.0	02.7	206	206.0	03.5	256	256.0	04.4
7	07.0	00.1	57	57.0	01.0	07	107.0	01.9	57	157.0	02.7	07	207.0	03.6	57	257.0	04.4
8	08.0	00.1	58	58.0	01.0	08	108.0	01.9	58	158.0	02.7	08	208.0	03.6	58	258.0	04.4
9	09.0	00.2	59	59.0	01.0	09	109.0	01.9	59	159.0	02.7	09	209.0	03.6	59	259.0	04.4
10	10.0	00.2	60	60.0	01.1	10	110.0	01.9	60	160.0	02.8	10	210.0	03.6	60	260.0	04.5
11	11.0	00.2	61	61.0	01.1	111	111.0	01.9	161	161.0	02.8	211	211.0	03.6	261	261.0	04.5
12	12.0	00.2	62	62.0	01.1	12	112.0	01.9	62	162.0	02.8	12	212.0	03.6	62	262.0	04.5
13	13.0	00.2	63	63.0	01.1	13	113.0	02.0	63	163.0	02.8	13	213.0	03.7	63	263.0	04.5
14	14.0	00.2	64	64.0	01.1	14	114.0	02.0	64	164.0	02.8	14	214.0	03.7	64	264.0	04.5
15	15.0	00.3	65	65.0	01.1	15	115.0	02.0	65	165.0	02.9	15	215.0	03.7	65	265.0	04.6
16	16.0	00.3	66	66.0	01.2	116	116.0	02.0	166	166.0	02.9	216	216.0	03.7	266	266.0	04.6
17	17.0	00.3	67	67.0	01.2	17	117.0	02.0	67	167.0	02.9	17	217.0	03.7	67	267.0	04.6
18	18.0	00.3	68	68.0	01.2	18	118.0	02.1	68	168.0	02.9	18	218.0	03.8	68	268.0	04.6
19	19.0	00.3	69	69.0	01.2	19	119.0	02.1	69	169.0	02.9	19	219.0	03.8	69	269.0	04.6
20	20.0	00.4	70	70.0	01.2	20	120.0	02.1	70	170.0	02.9	20	220.0	03.8	70	270.0	04.6
21	21.0	00.4	71	71.0	01.2	121	121.0	02.1	171	171.0	03.0	221	221.0	03.8	271	271.0	04.7
22	22.0	00.4	72	72.0	01.3	22	122.0	02.1	72	172.0	03.0	22	222.0	03.8	72	272.0	04.7
23	23.0	00.4	73	73.0	01.3	23	123.0	02.1	73	173.0	03.0	23	223.0	03.8	73	273.0	04.7
24	24.0	00.4	74	74.0	01.3	24	124.0	02.2	74	174.0	03.0	24	224.0	03.9	74	274.0	04.7
25	25.0	00.4	75	75.0	01.3	25	125.0	02.2	75	175.0	03.0	25	225.0	03.9	75	275.0	04.7
26	26.0	00.5	76	76.0	01.3	126	126.0	02.2	176	176.0	03.0	226	226.0	03.9	276	276.0	04.7
27	27.0	00.5	77	77.0	01.3	27	127.0	02.2	77	177.0	03.1	27	227.0	03.9	77	277.0	04.8
28	28.0	00.5	78	78.0	01.4	28	128.0	02.2	78	178.0	03.1	28	228.0	03.9	78	278.0	04.8
29	29.0	00.5	79	79.0	01.4	29	129.0	02.2	79	179.0	03.1	29	229.0	03.9	79	279.0	04.8
30	30.0	00.5	80	80.0	01.4	30	130.0	02.3	80	180.0	03.1	30	230.0	04.0	80	280.0	04.8
31	31.0	00.5	81	81.0	01.4	131	131.0	02.3	181	181.0	03.1	231	231.0	04.0	281	281.0	04.8
32	32.0	00.6	82	82.0	01.4	32	132.0	02.3	82	182.0	03.1	32	232.0	04.0	82	282.0	04.8
33	33.0	00.6	83	83.0	01.5	33	133.0	02.3	83	183.0	03.2	33	233.0	04.0	83	283.0	04.9
34	34.0	00.6	84	84.0	01.5	34	134.0	02.3	84	184.0	03.2	34	234.0	04.0	84	284.0	04.9
35	35.0	00.6	85	85.0	01.5	35	135.0	02.3	85	185.0	03.2	35	235.0	04.0	85	285.0	04.9
36	36.0	00.6	86	86.0	01.5	136	136.0	02.4	186	186.0	03.2	236	236.0	04.1	286	286.0	04.9
37	37.0	00.6	87	87.0	01.5	37	137.0	02.4	87	187.0	03.2	37	237.0	04.1	87	287.0	04.9
38	38.0	00.7	88	88.0	01.5	38	138.0	02.4	88	188.0	03.2	38	238.0	04.1	88	288.0	04.9
39	39.0	00.7	89	89.0	01.6	39	139.0	02.4	89	189.0	03.3	39	239.0	04.1	89	289.0	05.0
40	40.0	00.7	90	90.0	01.6	40	140.0	02.4	90	190.0	03.3	40	240.0	04.1	90	290.0	05.0
41	41.0	00.7	91	91.0	01.6	141	141.0	02.4	191	191.0	03.3	241	241.0	04.1	291	291.0	05.0
42	42.0	00.7	92	92.0	01.6	42	142.0	02.5	92	192.0	03.3	42	242.0	04.2	92	292.0	05.0
43	43.0	00.8	93	93.0	01.6	43	143.0	02.5	93	193.0	03.3	43	243.0	04.2	93	293.0	05.0
44	44.0	00.8	94	94.0	01.6	44	144.0	02.5	94	194.0	03.3	44	244.0	04.2	94	294.0	05.0
45	45.0	00.8	95	95.0	01.7	45	145.0	02.5	95	195.0	03.4	45	245.0	04.2	95	295.0	05.1
46	46.0	00.8	96	96.0	01.7	146	146.0	02.5	196	196.0	03.4	246	246.0	04.2	296	296.0	05.1
47	47.0	00.8	97	97.0	01.7	47	147.0	02.5	97	197.0	03.4	47	247.0	04.2	97	297.0	05.1
48	48.0	00.8	98	98.0	01.7	48	148.0	02.6	98	198.0	03.4	48	248.0	04.3	98	298.0	05.1
49	49.0	00.9	99	99.0	01.7	49	149.0	02.6	99	199.0	03.4	49	249.0	04.3	99	299.0	05.1
50	50.0	00.9	100	100.0	01.7	150	150.0	02.6	200	200.0	03.4	250	250.0	04.3	300	300.0	05.1
Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat

for 89 Deg.

Dist	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	01.0	00.0	51	51.0	01.8	101	100.9	03.5	151	150.9	05.3	201	200.9	07.0	251	250.8	08.8
2	02.0	00.1	52	52.0	01.8	02	101.9	03.6	52	151.9	05.3	0	201.9	07.1	52	251.8	08.8
3	03.0	00.1	53	53.0	01.8	03	102.9	03.6	53	152.9	05.4	03	202.9	07.1	53	252.8	08.9
4	04.0	00.1	54	54.0	01.9	04	103.9	03.6	54	153.9	05.4	04	203.9	07.1	54	253.8	08.9
5	05.0	00.2	55	55.0	01.9	05	104.9	03.7	55	154.9	05.4	05	204.9	07.2	55	254.8	08.9
6	06.0	00.2	56	56.0	02.0	106	105.9	03.7	156	155.9	05.5	206	205.9	07.2	256	255.8	09.0
7	07.0	00.2	57	57.0	02.0	07	106.9	03.7	57	156.9	05.5	07	206.9	07.2	57	256.8	09.0
8	08.0	00.3	58	58.0	02.0	08	107.9	03.8	58	157.9	05.5	08	207.9	07.3	58	257.8	09.0
9	09.0	00.3	59	59.0	02.1	09	108.9	03.8	59	158.9	05.6	09	208.9	07.3	59	258.8	09.1
10	10.0	00.4	60	60.0	02.1	10	109.9	03.9	60	159.9	05.6	10	209.9	07.4	60	259.8	09.1
11	11.0	00.4	61	61.0	02.1	111	110.9	03.9	161	160.9	05.6	211	210.9	07.4	261	260.8	09.1
12	12.0	00.4	62	62.0	02.2	12	111.9	03.9	62	161.9	05.7	12	211.9	07.4	62	261.8	09.2
13	13.0	00.5	63	63.0	02.2	13	112.9	04.0	63	162.9	05.7	13	212.9	07.5	63	262.8	09.2
14	14.0	00.5	64	64.0	02.2	14	113.9	04.0	64	163.9	05.7	14	213.9	07.5	64	263.8	09.2
15	15.0	00.5	65	65.0	02.3	15	114.9	04.0	65	164.9	05.8	15	214.9	07.5	65	264.8	09.3
16	16.0	00.6	66	66.0	02.3	116	115.9	04.1	166	165.9	05.8	216	215.9	07.6	266	265.8	09.3
17	17.0	00.6	67	67.0	02.3	17	116.9	04.1	67	166.9	05.8	17	216.9	07.6	67	266.8	09.3
18	18.0	00.6	68	68.0	02.4	18	117.9	04.1	68	167.9	05.9	18	217.9	07.6	68	267.8	09.4
19	19.0	00.7	69	69.0	02.4	19	118.9	04.2	69	168.9	05.9	19	218.9	07.7	69	268.8	09.4
20	20.0	00.7	70	70.0	02.4	20	119.9	04.2	70	169.9	06.0	20	219.9	07.7	70	269.8	09.5
21	21.0	00.7	71	71.0	02.5	121	120.9	04.2	171	170.9	06.0	221	220.9	07.7	271	270.8	09.5
22	22.0	00.8	72	72.0	02.5	22	121.9	04.3	72	171.9	06.0	22	221.9	07.8	72	271.8	09.5
23	23.0	00.8	73	73.0	02.5	23	122.9	04.3	73	172.9	06.1	23	222.9	07.8	73	272.8	09.6
24	24.0	00.8	74	74.0	02.6	24	123.9	04.3	74	173.9	06.1	24	223.9	07.8	74	273.8	09.6
25	25.0	00.9	75	75.0	02.6	25	124.9	04.4	75	174.9	06.1	25	224.9	07.9	75	274.8	09.6
26	26.0	00.9	76	76.0	02.7	126	125.9	04.4	176	175.9	06.2	226	225.9	07.9	276	275.8	09.7
27	27.0	00.9	77	77.0	02.7	27	126.9	04.4	77	176.9	06.2	27	226.9	07.9	77	276.8	09.7
28	28.0	01.0	78	78.0	02.7	28	127.9	04.5	78	177.9	06.2	28	227.9	08.0	78	277.8	09.7
29	29.0	01.0	79	79.0	02.8	29	128.9	04.5	79	178.9	06.3	29	228.9	08.0	79	278.8	09.8
30	30.0	01.1	80	80.0	02.8	30	129.9	04.6	80	179.9	06.3	30	229.9	08.1	80	279.8	09.8
31	31.0	01.1	81	81.0	02.8	131	130.9	04.6	181	180.9	06.3	231	230.9	08.1	281	280.8	09.8
32	32.0	01.1	82	81.9	02.9	32	131.9	04.6	82	181.9	06.4	32	231.9	08.1	82	281.8	09.9
33	33.0	01.2	83	82.9	02.9	33	132.9	04.7	83	182.9	06.4	33	232.9	08.2	83	282.8	09.9
34	34.0	01.2	84	83.9	02.9	34	133.9	04.7	84	183.9	06.4	34	233.9	08.2	84	283.8	09.9
35	35.0	01.2	85	84.9	03.0	35	134.9	04.7	85	184.9	06.5	35	234.9	08.2	85	284.8	10.0
36	36.0	01.3	86	85.9	03.0	136	135.9	04.8	186	185.9	06.5	236	235.9	08.3	286	285.8	10 0
37	37.0	01.3	87	86.9	03.0	37	136.9	04.8	87	186.9	06.5	37	236.9	08.3	87	286.8	10.0
38	38.0	01.3	88	87.9	03.1	38	137.9	04.8	88	187.9	06,6	38	237.9	08.3	88	287.8	10.1
39	39.0	01.4	89	88.9	03.1	39	138.9	04.9	89	188.9	06.6	39	238.9	08.4	89	288.8	10.1
40	40.0	01.4	90	89.9	03.1	40	139.9	04.9	90	189.9	06.7	40	239.9	08.4	90	289.8	10.2
41	41.0	01.4	91	90.9	03.2	141	140.9	04.9	191	190.9	06.7	241	240.9	08.4	291	290.8	10.2
42	42.0	01.5	92	91.9	03.2	42	141.9	05.0	92	191.9	06.7	42	241.9	08.5	92	291.8	10 2
43	43.0	01.5	93	92.9	03.2	43	142.9	05.0	93	192.9	06.8	43	242.9	08.5	93	292.8	10 3
44	44.0	01.5	94	93.9	03.3	44	143.9	05.0	94	193.9	06.8	44	243.9	08.5	94	293.8	10.3
45	45.0	01.6	95	94.9	03.3	45	144.9	05.1	95	194.9	06.8	45	244.9	08.6	95	294.8	10.3
46	46.0	01.6	96	95.9	03.4	146	145.9	05.1	196	195.9	06.9	246	245.9	08.6	296	295.8	10.4
47	47.0	01.6	97	96.9	03.4	47	146.9	05.1	97	196.9	06.9	47	246.9	08.6	97	296.8	10.4
48	48.0	01.7	98	97.9	03.4	48	147.9	05.2	98	197.9	06.9	48	247.9	08.7	98	297.8	10.4
49	49.0	01.7	99	98.9	03.5	49	148.9	05.2	99	198.9	07.0	49	248.9	08.7	99	298.8	10.5
50	50.0	01.7	100	99.9	03.5	150	149.9	05.3	200	199.9	07.0	250	249.9	08.8	300	299.8	10.5
Dist	Dep	Lat	Dip	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat.	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	01.0	00.1	51	50.9	02.7	101	100.9	05.3	151	150.8	07.9	201	200.7	10.5	251	250.6	13.1
2	02.0	00.1	52	51.9	02.7	02	101.9	05.3	52	151.8	08.0	02	201.7	10.6	52	251.6	13.2
3	03.0	00.2	53	52.9	02.8	03	102.9	05.4	53	152.8	08.0	03	202.7	10.6	53	252.6	13.2
4	04.0	00,2	54	53.9	02.8	04	103.9	05.4	54	153.8	08.1	04	203.7	10.7	54	253.6	13.3
5	05.0	00.3	55	54.9	02.9	05	104.9	05.5	55	154.8	08.1	05	204.7	10.7	55	254.6	13.3
6	06.0	00.3	56	55.9	02.9	106	105.9	05.5	156	155.8	08.2	206	205.7	10.8	256	255.6	13.4
7	07.0	00.4	57	56.9	03.0	07	106.9	05.6	57	156.8	08.2	07	206.7	10.8	57	256.6	13.4
8	08.0	00.4	58	57.9	03.0	08	107.8	05.7	58	157.8	08.3	08	207.7	10.9	58	257.6	13.5
9	09.0	00.5	59	58.9	03.1	09	108.8	05.7	59	158.8	08.3	09	208.7	10.9	59	258.6	13.6
10	10.0	00.5	60	59.9	03.1	10	109.8	05.8	60	159.8	08.4	10	209.7	11.0	60	259.6	13.6
11	11.0	00.6	61	60.9	03.2	111	110.8	05.8	161	160.8	08.4	211	210.7	11.0	261	260.6	13.7
12	12.0	00.6	62	61.9	03.2	12	111.8	05.9	62	161.8	08.5	12	211.7	11.1	62	261.6	13.7
13	13.0	00.7	63	62.9	03.3	13	112.8	05.9	63	162.8	08.5	13	212.7	11.1	63	262.6	13.8
14	14.0	00.7	64	63.9	03.3	14	113.8	06.0	64	163.8	08.6	14	213.7	11.2	64	263.6	13.8
15	15.0	00.8	65	64.9	03.4	15	114.8	06.0	65	164.8	08.6	15	214.7	11.2	65	264.6	13.9
16	16.0	00.8	66	65.9	03.5	116	115.8	06.1	166	165.8	08.7	216	215.7	11.3	266	265.6	13.9
17	17.0	00.9	67	66.9	03.5	17	116.8	06.1	67	166.8	08.7	17	216.7	11.4	67	266.6	14.0
18	18.0	00.9	68	67.9	03.6	18	117.8	06.2	68	167.8	08.8	18	217.7	11.4	68	267.6	14.0
19	19.0	01.0	69	68.9	03.6	19	118.8	06.2	69	168.8	08.8	19	218.7	11.5	69	268.6	14.1
20	20.0	01.0	70	69.9	03.7	20	119.8	06.3	70	169.8	08.9	20	219.7	11.5	70	269.6	14.1
21	21.0	01.1	71	70.9	03.7	121	120.8	06.3	171	170.8	09.0	221	220.7	11.6	271	270.6	14.2
22	22.0	01.1	72	71.9	03.8	22	121.8	06.4	72	171.8	09.0	22	221.7	11.6	72	271.6	14.2
23	23.0	01.2	73	72.9	03.8	23	122.8	06.4	73	172.8	09.1	23	222.7	11.7	73	272.6	14.3
24	24.0	01.3	74	73.9	03.9	24	123.8	06.5	74	173.8	09.1	24	223.7	11.7	74	273.6	14.3
25	25.0	01.3	75	74.9	03.9	25	124.8	06.5	75	174.8	09.2	25	224.7	11.8	75	274.6	14.4
26	26.0	01.4	76	75.9	04.0	126	125.8	06.6	176	175.8	09.2	226	225.7	11.8	276	275.6	14.4
27	27.0	01.4	77	76.9	04.0	27	126.8	06.6	77	176.8	09.3	27	226.7	11.9	77	276.6	14.5
28	28.0	01.5	78	77.9	04.1	28	127.8	06.7	78	177.8	09.3	28	227.7	11.9	78	277.6	14.5
29	29.0	01.5	79	78.9	04.1	29	128.8	06.8	79	178.7	09.4	29	228.7	12.0	79	278.6	14.6
30	30.0	01.6	80	79.9	04.2	30	129.8	06.8	80	179.7	09.4	30	229.7	12.0	80	279.6	14.7
31	31.0	01.6	81	80.9	04.2	131	130.8	06.9	181	180.7	09.5	231	230.7	12.1	281	280.6	14.7
32	32.0	01.7	82	81.9	04.3	32	131.8	06.9	82	181.7	09.5	32	231.7	12.1	82	281.6	13.8
33	33.0	01.7	83	82.9	04.3	33	132.8	07.0	83	182.7	09.6	33	232.7	12.2	83	282.6	14.8
34	34.0	01.8	84	83.9	04.4	34	133.8	07.0	84	183.7	09.6	34	233.7	12.2	84	283.6	14.9
35	35.0	01.8	85	84.9	04.4	35	134.8	07.1	85	184.7	09.7	35	234.7	12.3	85	284.6	14.9
36	35.9	01.9	86	85.9	04.5	136	135.8	07.1	186	185.7	09.7	236	235.7	12.3	286	285.6	15.0
37	36.9	01.9	87	86.9	04.6	37	136.8	07.2	87	186.7	09.8	37	236.7	12.4	87	286.6	15.0
38	37.9	02.0	88	87.9	04.6	38	137.8	07.2	88	187.7	09.8	38	237.7	12.5	88	287.6	15.1
39	38.9	02.0	89	88.9	04.7	39	138.8	07.3	89	188.7	09.9	39	238.7	12.3	89	288.6	15.1
40	39.9	02.1	90	89.9	04.7	40	139.8	07.3	90	189.7	09.9	40	239.7	12.6	90	289.6	15.2
41	40.9	02.1	91	90.9	04.8	141	140.8	07.4	191	190.7	10.0	241	240.7	12.6	291	290.6	15.2
42	41.9	02.2	92	91.9	04.8	42	141.8	07.4	92	191.7	10.0	42	241.7	12.7	92	291.6	15.3
43	42.9	02.2	93	92.9	04.9	43	142.8	07.5	93	192.7	10.1	43	242.7	12.7	93	292.6	15.3
44	43.9	02.3	94	93.9	04.9	44	143.8	07.5	94	193.7	10.1	44	243.7	12.8	94	293.6	15.4
45	44.9	02.4	95	94.9	05.0	45	144.8	07.6	95	194.7	10.2	45	244.7	12.8	95	294.6	15.4
46	45.9	02.4	96	95.9	05.0	146	145.8	07.6	196	195.7	10.3	246	245.7	12.9	296	295.6	15.5
47	46.9	02.5	97	96.9	05.1	47	146.8	07.7	97	196.7	10.3	47	246.7	12.9	97	296.6	15.5
48	47.9	02.5	98	97.9	05.1	48	147.8	07.7	98	197.7	10.4	48	247.7	13.0	98	297.6	15.6
49	48.9	02.6	99	98.9	05.2	49	148.8	07.8	99	198.7	10.4	49	248.7	13.0	99	298.6	15.6
50	49.9	02.6	100	99.9	05.2	150	149.8	07.9	200	199.7	10.5	250	249.7	13.1	300	299.6	15.7
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

for 87 Deg.

Difference of Latitude and Departure for 4 Deg.

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	01.0	00.1	51	50.9	03.6	101	100.8	07.0	151	150.6	10.5	201	200.5	14.0	251	250.4	17.5
2	02.0	00.1	52	51.9	03.6	02	101.8	07.1	52	151.6	10.6	02	201.5	14.1	52	251.4	17.6
3	03.0	00.2	53	52.9	03.7	03	102.8	07.2	53	152.6	10.7	03	202.5	14.1	53	252.4	17.6
4	04.0	00.3	54	53.9	03.8	04	103.8	07.2	54	153.6	10.7	04	203.5	14.2	54	253.4	17.7
5	05.0	00.3	55	54.9	03.8	05	104.7	07.3	55	154.6	10.8	05	204.5	14.3	55	254.4	17.8
6	06.0	00.4	56	55.9	03.9	106	105.7	07.4	156	155.6	10.9	206	205.5	14.4	256	255.4	17.8
7	07.0	00.5	57	56.9	04.0	07	106.7	07.5	57	156.6	10.9	07	206.5	14.4	57	256.4	17.9
8	08.0	00.6	58	57.9	04.0	08	107.7	07.5	58	157.6	11.0	08	207.5	14.5	58	257.4	18.0
9	09.0	00.6	59	58.9	04.1	09	108.7	07.6	59	158.6	11.1	09	208.5	14.6	59	258.4	18.1
10	10.0	00.7	60	59.9	04.2	10	109.7	07.7	60	159.6	11.2	10	209.5	14.6	60	259.4	18.1
11	11.0	00.8	61	60.9	04.3	111	110.7	07.7	161	160.6	11.2	211	210.5	14.7	261	260.4	18.2
12	12.0	00.8	62	61.9	04.3	12	111.7	07.8	62	161.6	11.3	12	211.5	14.8	62	261.4	18.3
13	13.0	00.9	63	62.8	04.4	13	112.7	07.9	63	162.6	11.4	13	212.5	14.8	63	262.4	18.3
14	14.0	01.0	64	63.8	04.5	14	113.7	07.9	64	163.6	11.4	14	213.5	14.9	64	263.4	18.4
15	15.0	01.0	65	64.8	04.5	15	114.7	08.0	65	164.6	11.5	15	214.5	15.0	65	264.4	18.5
16	16.0	01.1	66	65.8	04.6	116	115.7	08.1	166	165.6	11.6	216	215.5	15.1	266	265.4	18.5
17	17.0	01.2	67	66.8	04.7	17	116.7	08.2	67	166.6	11.6	17	216.5	15.1	67	266.4	18.6
18	18.0	01.3	68	67.8	04.7	18	117.7	08.2	68	167.6	11.7	18	217.5	15.2	68	267.4	18.7
19	19.0	01.3	69	68.8	04.8	19	118.7	08.3	69	168.6	11.8	19	218.5	15.3	69	268.4	18.7
20	20.0	01.4	70	69.8	04.9	20	119.7	08.4	70	169.6	11.8	20	219.5	15.3	70	269.4	18.8
21	20.9	01.5	71	70.8	05.0	121	120.7	08.4	171	170.6	11.9	221	220.5	15.4	271	270.3	18.9
22	21.9	01.5	72	71.8	05.0	22	121.7	08.5	72	171.6	12.0	22	221.5	15.5	72	271.3	19.0
23	22.9	01.6	73	72.8	05.1	23	122.7	08.6	73	172.6	12.1	23	222.5	15.5	73	272.3	19.0
24	23.9	01.7	74	73.8	05.2	24	123.7	08.6	74	173.6	12.1	24	223.5	15.6	74	273.3	19.1
25	24.9	01.7	75	74.8	05.2	25	124.7	08.7	75	174.6	12.2	25	224.5	15.7	75	274.3	19.2
26	25.9	01.8	76	75.8	05.3	126	125.7	08.8	176	175.6	12.3	226	225.5	15.8	276	275.3	19.2
27	26.9	01.9	77	76.8	05.4	27	126.7	08.9	77	176.6	12.3	27	226.5	15.8	77	276.3	19.3
28	27.9	02.0	78	77.8	05.4	28	127.7	08.9	78	177.6	12.4	28	227.5	15.9	78	277.3	19.4
29	28.9	02.0	79	78.8	05.5	29	128.7	09.0	79	178.6	12.5	29	228.5	16.0	79	278.3	19.4
30	29.9	02.1	80	79.8	05.6	30	129.7	09.1	80	179.6	12.5	30	229.4	16.0	80	279.3	19.5
31	30.9	02.2	81	80.8	05.7	131	130.7	09.1	181	180.6	12.6	231	230.4	16.1	281	280.3	19.6
32	31.9	02.2	82	81.8	05.7	32	131.7	09.2	82	181.6	12.7	32	231.4	16.2	82	281.3	19.7
33	32.9	02.3	83	82.8	05.8	33	132.7	09.3	83	182.6	12.8	33	232.4	16.2	83	282.3	19.7
34	33.9	02.4	84	83.8	05.9	34	133.7	09.3	84	183.6	12.8	34	233.4	16.3	84	283.3	19.8
35	34.9	02.4	85	84.8	05.9	35	134.7	09.4	85	184.6	12.9	35	234.4	16.4	85	284.3	19.9
36	35.9	02.5	86	85.8	06.0	136	135.7	09.5	186	185.6	13.0	236	235.4	16.4	286	285.3	19.9
37	36.9	02.6	87	86.8	06.1	37	136.7	09.5	87	186.6	13.0	37	236.4	16.5	87	286.3	20.0
38	37.9	02.7	88	87.8	06.1	38	137.7	09.6	88	187.5	13.1	38	237.4	16.6	88	287.3	20.0
39	38.9	02.7	89	88.8	06.2	39	138.7	09.7	89	188.5	13.2	39	238.4	16.7	89	288.3	20.1
40	39.9	02.8	90	89.8	06.3	40	139.7	09.8	90	189.5	13.2	40	239.4	16.7	90	289.3	20.2
41	40.9	02.9	91	90.8	06.4	141	140.7	09.8	191	190.5	13.3	241	240.4	16.8	291	290.3	20.3
42	41.9	02.9	92	91.8	06.4	42	141.7	09.9	92	191.5	13.4	42	241.4	16.9	92	291.3	20.4
43	42.9	03.0	93	92.8	06.5	43	142.7	10.0	93	192.5	13.5	43	242.4	16.9	93	292.3	20.4
44	43.9	03.1	94	93.8	06.6	44	143.7	10.0	94	193.5	13.5	44	243.4	17.0	94	293.3	20.5
45	44.9	03.1	95	94.8	06.6	45	144.7	10.1	95	194.5	13.6	45	244.4	17.1	95	294.3	20.6
46	45.9	03.2	96	95.8	06.7	146	145.6	10.2	196	195.5	13.7	246	245.4	17.1	296	295.3	20.6
47	46.9	03.3	97	96.8	06.8	47	146.6	10.2	97	196.5	13.7	47	246.4	17.2	97	296.3	20.7
48	47.9	03.4	98	97.8	06.8	48	147.6	10.3	98	197.5	13.8	48	247.4	17.3	98	297.3	20.8
49	48.9	03.4	99	98.8	06.9	49	148.6	10.4	99	198.5	13.9	49	248.4	17.4	99	298.3	20.8
50	49.9	03.5	100	99.8	07.0	150	149.6	10.5	200	199.5	13.9	250	249.4	17.4	300	299.3	20.9
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	01.0	00.1	51	50.8	04.4	101	100.6	08.8	151	150.4	13.1	201	200.2	17.5	251	250.0	21.8
2	02.0	00.2	52	51.8	04.5	02	101.6	08.9	52	151.4	13.2	02	201.2	17.6	52	251.0	21.9
3	03.0	00.3	53	52.8	04.6	03	102.6	09.0	53	152.4	13.3	03	202.2	17.7	53	252.0	22.0
4	04.0	00.3	54	53.8	04.7	04	103.6	09.0	54	153.4	13.4	04	203.2	17.7	54	253.0	22.1
5	05.0	00.4	55	54.8	04.8	05	104.6	09.1	55	154.4	13.5	05	204.2	17.8	55	254.0	22.2
6	06.0	00.5	56	55.8	04.9	106	105.6	09.2	156	155.4	13.6	206	205.2	17.9	256	255.0	22.3
7	07.0	00.6	57	56.8	05.0	07	106.6	09.3	57	156.4	13.7	07	206.2	18.0	57	256.0	22.4
8	08.0	00.7	58	57.8	05.1	08	107.6	09.4	58	157.4	13.7	08	207.2	18.1	58	257.0	22.4
9	09.0	00.8	59	58.8	05.1	09	108.6	09.5	59	158.4	13.8	09	208.2	18.2	59	258.0	22.5
10	10.0	00.9	60	59.8	05.2	10	109.6	09.6	60	159.4	13.9	10	209.2	18.3	60	259.0	22.6
11	11.0	01.0	61	60.8	05.3	111	110.6	09.7	161	160.4	14.0	211	210.2	18.4	261	260.0	22.7
12	12.0	01.0	62	61.8	05.4	12	111.6	09.7	62	161.4	14.1	12	211.2	18.4	62	261.0	22.8
13	12.9	01.1	63	62.8	05.5	13	112.6	09.8	63	162.4	14.2	13	212.2	18.5	63	262.0	22.9
14	13.9	01.2	64	63.8	05.6	14	113.6	09.9	64	163.4	14.3	14	213.2	18.6	64	263.0	23.0
15	14.9	01.3	65	64.8	05.7	15	114.6	10.0	65	164.4	14.4	15	214.2	18.7	65	264.0	23.1
16	15.9	01.4	66	65.7	05.8	116	115.6	10.1	166	165.4	14.4	216	215.2	18.8	266	265.0	23.1
17	16.9	01.5	67	66.7	05.8	17	116.6	10.2	67	166.4	14.5	17	216.2	18.9	67	266.0	23.2
18	17.9	01.6	68	67.7	05.9	18	117.6	10.3	68	167.4	14.6	18	217.2	19.0	68	267.0	23.3
19	18.9	01.7	69	68.7	06.0	19	118.5	10.4	69	168.4	14.7	19	218.2	19.1	69	268.0	23.4
20	19.9	01.7	70	69.7	06.1	20	119.5	10.4	70	169.4	14.8	20	219.2	19.1	70	269.0	23.5
21	20.9	01.8	71	70.7	06.2	121	120.5	10.5	171	170.4	14.9	221	220.2	19.2	271	270.0	23.6
22	21.9	01.9	72	71.7	06.3	22	121.5	10.6	72	171.3	15.0	22	221.2	19.3	72	271.0	23.7
23	22.9	02.0	73	72.7	06.4	23	122.5	10.7	73	172.3	15.1	23	222.2	19.4	73	272.0	23.8
24	23.9	02.1	74	73.7	06.5	24	123.5	10.8	74	173.3	15.1	24	223.1	19.5	74	273.0	23.8
25	24.9	02.2	75	74.7	06.5	25	124.5	10.9	75	174.3	15.2	25	224.1	19.6	75	274.0	23.9
26	25.9	02.3	76	75.7	06.6	126	125.5	11.0	176	175.3	15.3	226	225.1	19.7	276	275.0	24.0
27	26.9	02.4	77	76.7	06.7	27	126.5	11.0	77	176.3	15.4	27	226.1	19.7	77	275.9	24.1
28	27.9	02.4	78	77.7	06.8	28	127.5	11.1	78	177.3	15.5	28	227.1	19.8	78	276.9	24.2
29	28.9	02.5	79	78.7	06.9	29	128.5	11.2	79	178.3	15.6	29	228.1	19.9	79	277.9	24.3
30	29.9	02.6	80	79.7	07.0	30	129.5	11.3	80	179.3	15.7	30	229.1	20.0	80	278.9	24.4
31	30.9	02.7	81	80.7	07.1	131	130.5	11.4	181	180.3	15.7	231	230.1	20.1	281	279.9	24.4
32	31.9	02.8	82	81.7	07.2	32	131.5	11.5	82	181.3	15.8	32	231.1	20.2	82	280.9	24.5
33	32.9	02.9	83	82.7	07.2	33	132.5	11.6	83	182.3	15.9	33	232.1	20.3	83	281.9	24.6
34	33.9	03.0	84	83.7	07.3	34	133.5	11.7	84	183.3	16.0	34	233.1	20.4	84	282.9	24.7
35	34.9	03.1	85	84.7	07.4	35	134.5	11.7	85	184.3	16.1	35	234.1	20.4	85	283.9	24.8
36	35.9	03.1	86	85.7	07.5	136	135.5	11.8	186	185.3	16.2	236	235.1	20.5	286	284.9	24.9
37	36.9	03.2	87	86.7	07.6	37	136.5	11.9	87	186.3	16.3	37	236.1	20.6	87	285.9	25.0
38	37.9	03.3	88	87.7	07.7	38	137.5	12.0	88	187.3	16.4	38	237.1	20.7	88	286.9	25.1
39	38.9	03.4	89	88.7	07.8	39	138.5	12.1	89	188.3	16.4	39	238.1	20.8	89	287.9	25.1
40	39.8	03.5	90	89.7	07.8	40	139.5	12.2	90	189.3	16.5	40	239.1	20.9	90	288.9	25.2
41	40.8	03.6	91	90.7	07.9	141	140.5	12.3	191	190.3	16.6	241	240.1	21.0	291	289.9	25.3
42	41.8	03.7	92	91.6	08.0	42	141.5	12.4	92	191.3	16.7	42	241.1	21.1	92	290.9	25.4
43	42.8	03.8	93	92.6	08.1	43	142.5	12.4	93	192.3	16.8	43	242.1	21.1	93	291.9	25.5
44	43.8	03.8	94	93.6	08.2	44	143.5	12.5	94	193.3	16.9	44	243.1	21.2	94	292.9	25.6
45	44.8	03.9	95	94.6	08.3	45	144.4	12.6	95	194.3	17.0	45	244.1	21.3	95	293.9	25.7
46	45.8	04.0	96	95.6	08.4	146	145.4	12.7	196	195.3	17.1	246	245.1	21.4	296	294.9	25.8
47	46.8	04.1	97	96.6	08.5	47	146.4	12.8	97	196.3	17.1	47	246.1	21.5	97	295.9	25.8
48	47.8	04.2	98	97.6	08.5	48	147.4	12.9	98	197.2	17.2	48	247.1	21.6	98	296.9	25.9
49	48.8	04.3	99	98.6	08.6	49	148.4	13.0	99	198.2	17.3	49	248.1	21.7	99	297.9	26.0
50	49.8	04.4	100	99.6	08.7	150	149.4	13.1	200	199.2	17.4	250	249.1	21.8	300	298.9	26.1
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

for 85 Deg.

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	01.0	00.1	51	50.7	05.3	101	100.4	10.6	151	150.2	15.8	201	199.9	21.0	251	249.6	26.2
2	02.0	00.2	52	51.7	05.4	02	101.4	10.7	52	151.2	15.9	02	200.9	21.1	52	250.6	26.3
3	03.0	00.3	53	52.7	05.5	03	102.4	10.8	53	152.2	16.0	03	201.9	21.2	53	251.6	26.4
4	04.0	00.4	54	53.7	05.6	04	103.4	10.9	54	153.2	16.1	04	202.9	21.3	54	252.6	26.5
5	05.0	00.5	55	54.7	05.7	05	104.4	11.0	55	154.1	16.2	05	203.9	21.4	55	253.6	26.6
6	06.0	00.6	56	55.7	05.9	106	105.4	11.1	156	155.1	16.3	206	204.9	21.5	256	254.6	26.8
7	07.0	00.7	57	56.7	06.0	07	106.4	11.2	57	156.1	16.4	07	205.9	21.6	57	255.6	26.9
8	08.0	00.8	58	57.7	06.1	08	107.4	11.3	58	157.1	16.5	08	206.9	21.7	58	256.6	27.0
9	08.9	00.9	59	58.7	06.2	09	108.4	11.4	59	158.1	16.6	09	207.9	21.8	59	257.6	27.1
10	09.9	01.0	60	59.7	06.3	10	109.4	11.5	60	159.1	16.7	10	208.8	21.9	60	258.6	27.2
11	10.9	01.1	61	60.7	06.4	111	110.4	11.6	161	160.1	16.8	211	209.8	22.0	261	259.6	27.3
12	11.9	01.3	62	61.7	06.5	12	111.4	11.7	62	161.1	16.9	12	210.8	22.2	62	260.6	27.4
13	12.9	01.4	63	62.7	06.6	13	112.4	11.8	63	162.1	17.0	13	211.8	22.3	63	261.6	27.5
14	13.9	01.5	64	63.6	06.7	14	113.4	11.9	64	163.1	17.1	14	212.8	22.4	64	262.5	27.6
15	14.9	01.6	65	64.6	06.8	15	114.4	12.0	65	164.1	17.2	15	213.8	22.5	65	263.5	27.7
16	15.9	01.7	66	65.6	06.9	116	115.4	12.1	166	165.1	17.3	216	214.8	22.6	266	264.5	27.8
17	16.9	01.8	67	66.6	07.0	17	116.4	12.2	67	166.1	17.5	17	215.8	22.7	67	265.5	27.9
18	17.9	01.9	68	67.6	07.1	18	117.4	12.3	68	167.1	17.6	18	216.8	22.8	68	266.5	28.0
19	18.9	02.0	69	68.6	07.2	19	118.3	12.4	69	168.1	17.7	19	217.8	22.9	69	267.5	28.1
20	19.9	02.1	70	69.6	07.3	20	119.3	12.5	70	169.1	17.8	20	218.8	23.0	70	268.5	28.2
21	20.9	02.2	71	70.6	07.4	121	120.3	12.6	171	170.1	17.9	221	219.8	23.1	271	269.5	28.3
22	21.9	02.3	72	71.6	07.5	22	121.3	12.7	72	171.1	18.0	22	220.8	23.2	72	270.5	28.4
23	22.9	02.4	73	72.6	07.6	23	122.3	12.9	73	172.0	18.1	23	221.8	23.3	73	271.5	28.5
24	23.9	02.5	74	73.6	07.7	24	123.3	13.0	74	173.0	18.2	24	222.8	23.4	74	272.5	28.6
25	24.9	02.6	75	74.6	07.8	25	124.3	13.1	75	174.0	18.3	25	223.8	23.5	75	273.5	18.7
26	25.9	02.7	76	75.6	07.9	126	125.3	13.2	176	175.0	18.4	226	224.8	23.6	276	274.5	28.8
27	26.9	02.8	77	76.6	08.0	27	126.3	13.3	77	176.0	18.5	27	225.8	23.7	77	275.5	28.9
28	27.8	02.9	78	77.6	08.1	28	127.3	13.4	78	177.0	18.6	28	226.7	23.8	78	276.5	29.1
29	28.8	03.0	79	78.6	08.3	29	128.3	13.5	79	178.0	18.7	29	227.7	23.9	79	277.5	29.2
30	29.8	03.1	80	79.6	08.4	30	129.3	13.6	80	179.0	18.8	30	228.7	24.0	80	278.5	29.3
31	30.8	03.2	81	80.6	08.5	131	130.3	13.7	181	180.0	18.9	231	229.7	24.1	281	279.5	29.4
32	31.8	03.3	82	81.5	08.6	32	131.3	13.8	82	181.0	19.0	32	230.7	24.2	82	280.4	29.5
33	32.8	03.4	83	82.5	08.7	33	132.3	13.9	83	182.0	19.1	33	231.7	24.3	83	281.4	29.6
34	33.8	03.6	84	83.5	08.8	34	133.3	14.0	84	183.0	19.2	34	232.7	24.5	84	282.4	29.7
35	34.8	03.7	85	84.5	08.9	35	134.3	14.1	85	184.0	19.3	35	233.7	24.6	85	283.4	29.8
36	35.8	03.8	86	85.5	09.0	136	135.3	14.2	186	185.0	19.4	236	234.7	24.7	286	284.4	29.9
37	36.8	03.9	87	86.5	09.1	37	136.2	14.3	87	186.0	19.5	37	235.7	24.8	87	285.4	30.0
38	37.8	04.0	88	87.5	09.2	38	137.2	14.4	88	187.0	19.6	38	236.7	24.9	88	286.4	30.1
39	38.8	04.1	89	88.5	09.3	39	138.2	14.5	89	188.0	19.8	39	237.7	25.0	89	287.4	30.2
40	39.8	04.2	90	89.5	09.4	40	139.2	14.6	90	189.0	19.9	40	238.7	25.1	90	288.4	30.3
41	40.8	04.3	91	90.5	09.5	141	140.2	14.7	191	189.9	20.0	241	239.7	25.2	291	289.4	30.4
42	41.8	04.4	92	91.5	09.6	42	141.2	14.8	92	190.9	20.1	42	240.7	25.3	92	290.4	30.5
43	42.8	04.5	93	92.5	09.7	43	142.2	14.9	93	191.9	20.2	43	241.7	25.4	93	291.4	30.6
44	43.8	04.6	94	93.5	09.8	44	143.2	15.0	94	192.9	20.3	44	242.7	25.5	94	292.4	30.7
45	44.8	04.7	95	94.5	09.9	45	144.2	15.2	95	193.9	20.4	45	243.7	25.6	95	293.4	30.8
46	45.7	04.8	96	95.5	10.0	146	145.2	15.3	196	194.9	20.5	246	244.6	25.7	296	294.4	30.9
47	46.7	04.9	97	96.5	10.1	47	146.2	15.4	97	195.9	20.6	47	245.6	25.8	97	295.4	31.0
48	47.7	05.0	98	97.5	10.2	48	147.2	15.5	98	196.9	20.7	48	246.6	25.9	98	296.4	31.1
49	48.7	05.1	99	98.5	10.3	49	148.2	15.6	99	197.9	20.8	49	247.6	26.0	99	297.4	31.2
50	49.7	05.2	100	99.5	10.5	150	149.2	15.7	200	198.9	20.9	250	248.6	26.1	300	298.4	31.4
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Difference of Latitude and Departure for 7 Deg.

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	01.0	00.1	51	50.6	06.2	101	100.2	12.3	151	149.9	18.4	201	199.5	24.5	251	249.1	30.6
2	02.0	00.2	52	51.6	06.3	02	101.2	12.4	52	150.9	18.5	02	200.5	24.6	52	250.1	30.7
3	03.0	00.4	53	52.6	06.5	03	102.2	12.5	53	151.9	18.6	03	201.5	24.7	53	251.1	30.8
4	04.0	00.5	54	53.6	06.6	04	103.2	12.7	54	152.8	18.7	04	202.5	24.8	54	252.1	30.9
5	05.0	00.6	55	54.6	06.7	05	104.2	12.8	55	153.8	18.9	05	203.5	25.0	55	253.1	31.0
6	06.0	00.7	56	55.6	06.8	106	105.2	12.9	156	154.8	19.0	206	204.5	25.1	256	254.1	31.2
7	06.9	00.9	57	56.6	06.9	07	106.2	13.0	57	155.8	19.1	07	205.4	25.2	57	255.1	31.3
8	07.9	01.0	58	57.6	07.1	08	107.2	13.1	58	156.8	19.2	08	206.4	25.3	58	256.1	31.4
9	08.9	01.1	59	58.6	07.2	09	108.2	13.3	59	157.8	19.4	09	207.4	25.4	59	257.1	31.5
10	09.9	01.2	60	59.6	07.3	10	109.2	13.4	60	158.8	19.5	10	208.4	25.6	60	258.1	31.7
11	10.9	01.3	61	60.5	07.4	111	110.2	13.5	161	159.8	19.6	211	209.4	25.7	261	259.0	31.8
12	11.9	01.5	62	61.5	07.5	12	111.2	13.6	62	160.8	19.7	12	210.4	25.8	62	260.0	31.9
13	12.9	01.6	63	62.5	07.7	13	112.2	13.8	63	161.8	19.8	13	211.4	25.9	63	261.0	32.0
14	13.9	01.7	64	63.5	07.8	14	113.1	13.9	64	162.8	20.0	14	212.4	26.1	64	262.0	32.1
15	14.9	01.8	65	64.5	07.9	15	114.1	14.0	65	163.8	20.1	15	213.4	26.2	65	263.0	32.3
16	15.9	01.9	66	65.5	08.0	116	115.1	14.1	166	164.8	20.2	216	214.4	26.3	266	264.0	32.4
17	16.9	02.1	67	66.5	08.2	17	116.1	14.2	67	165.7	20.3	17	215.4	26.4	67	265.0	32.5
18	17.9	02.2	68	67.5	08.3	18	117.1	14.4	68	166.7	20.5	18	216.4	26.5	68	266.0	32.6
19	18.9	02.3	69	68.5	08.4	19	118.1	14.5	69	167.7	20.6	19	217.4	26.7	69	267.0	32.8
20	19.9	02.4	70	69.5	08.5	20	119.1	14.6	70	168.7	20.7	20	218.4	26.8	70	268.0	32.9
21	20.8	02.6	71	70.5	08.6	121	120.1	14.7	171	169.7	20.8	221	219.3	26.9	271	269.0	33.0
22	21.8	02.7	72	71.5	08.8	22	121.1	14.9	72	170.7	20.9	22	220.3	27.0	72	270.0	33.1
23	22.8	02.8	73	72.5	08.9	23	122.1	15.0	73	171.7	21.1	23	221.3	27.2	73	271.0	33.2
24	23.8	02.9	74	73.4	09.0	24	123.1	15.1	74	172.7	21.2	24	222.3	27.3	74	271.9	33.4
25	24.8	03.0	75	74.4	09.1	25	124.1	15.2	75	173.7	21.3	25	223.3	27.4	75	272.9	33.5
26	25.8	03.2	76	75.4	09.3	126	125.1	15.3	176	174.7	21.4	226	224.3	27.5	276	273.9	33.6
27	26.8	03.3	77	76.4	09.4	27	126.0	15.5	77	175.7	21.6	27	225.3	27.6	77	274.9	33.7
28	27.8	03.4	78	77.4	09.5	28	127.0	15.6	78	176.7	21.7	28	226.3	27.8	78	275.9	33.9
29	28.8	03.5	79	78.4	09.6	29	128.0	15.7	79	177.7	21.8	29	227.3	27.9	79	276.9	34.0
30	29.8	03.7	80	79.4	09.7	30	129.0	15.8	80	178.7	21.9	30	228.3	28.0	80	277.9	34.1
31	30.8	03.8	81	80.4	09.9	131	130.0	16.0	181	179.6	22.0	231	229.3	28.1	281	278.9	34.2
32	31.8	03.9	82	81.4	10.0	32	131.0	16.1	82	180.6	22.2	32	230.3	28.3	82	279.9	34.3
33	32.8	04.0	83	82.4	10.1	33	132.0	16.2	83	181.6	22.3	33	231.3	28.4	83	280.9	34.5
34	33.7	04.1	84	83.4	10.2	34	133.0	16.3	84	182.6	22.4	34	232.2	28.5	84	281.9	34.6
35	34.7	04.3	85	84.4	10.4	35	134.0	16.4	85	183.6	22.5	35	233.2	28.6	85	282.9	34.7
36	35.7	04.4	86	85.4	10.5	136	135.0	16.6	186	184.6	22.7	236	234.2	28.7	286	283.9	34.8
37	36.7	04.5	87	86.3	10.6	37	136.0	16.7	87	185.6	22.8	37	235.2	28.9	87	284.8	34.9
38	37.7	04.6	88	87.3	10.7	38	137.0	16.8	88	186.6	22.9	38	236.2	29.0	88	285.8	35.1
39	38.7	04.8	89	88.3	10.8	39	138.0	16.9	89	187.6	23.0	39	237.2	29.1	89	286.8	35.2
40	39.7	04.9	90	89.3	11.0	40	139.0	17.1	90	188.6	23.1	40	238.2	29.2	90	287.8	35.3
41	40.7	05.0	91	90.3	11.1	141	139.9	17.2	191	189.6	23.3	241	239.2	29.3	291	288.8	35.4
42	41.7	05.1	92	91.3	11.2	42	140.9	17.3	92	190.6	23.4	42	240.2	29.5	92	289.8	35.5
43	42.7	05.2	93	92.3	11.3	43	141.9	17.4	93	191.6	23.5	43	241.2	29.6	93	290.8	35.7
44	43.7	05.4	94	93.3	11.5	44	142.9	17.5	94	192.5	23.6	44	242.2	29.7	94	291.8	35.8
45	44.7	05.5	95	94.3	11.6	45	143.9	17.7	95	193.5	23.7	45	243.2	29.8	95	292.8	35.9
46	45.7	05.6	96	95.3	11.7	146	144.9	17.8	196	194.5	23.9	246	244.2	29.9	296	293.8	36.0
47	46.6	05.7	97	96.3	11.8	47	145.9	17.9	97	195.5	24.0	47	245.1	30.1	97	294.8	36.2
48	47.6	05.8	98	97.3	11.9	48	146.9	18.0	98	196.5	24.1	48	246.1	30.2	98	295.8	36.3
49	48.6	06.0	99	98.3	12.1	49	147.9	18.1	99	197.5	24.2	49	247.1	30.3	99	296.8	36.4
50	49.6	06.1	100	99.3	12.2	150	148.9	18.5	200	198.5	24.3	250	248.1	30.4	300	297.8	36.5
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

for 83 Deg.

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	01.0	00.1	51	50.5	07.1	101	100.0	14.1	151	149.5	21.0	201	199.1	28.0	251	248.6	34.9
2	02.0	00.3	52	51.5	07.2	02	101.0	14.2	52	150.5	21.2	02	200.0	28.1	52	249.6	35.1
3	03.0	00.4	53	52.5	07.4	03	102.0	14.3	53	151.5	21.3	03	201.0	28.3	53	250.5	35.2
4	04.0	00.6	54	53.5	07.5	04	103.0	14.5	54	152.5	21.4	04	202.0	28.4	54	251.5	35.4
5	05.0	00.7	55	54.5	07.7	05	104.0	14.6	55	153.5	21.6	05	203.0	28.5	55	252.5	35.5
6	05.9	00.8	56	55.5	07.8	106	105.0	14.8	156	154.5	21.7	206	204.0	28.7	256	253.5	35.6
7	06.9	01.0	57	56.4	07.9	07	106.0	14.9	57	155.5	21.9	07	205.0	28.8	57	254.5	35.8
8	07.9	01.1	58	57.4	08.1	08	107.0	15.0	58	156.5	22.0	08	206.0	29.0	58	255.5	35.9
9	08.9	01.3	59	58.4	08.2	09	107.9	15.2	59	157.5	22.1	09	207.0	29.1	59	256.5	36.1
10	09.9	01.4	60	59.4	08.4	10	108.9	15.3	60	158.4	22.3	10	208.0	29.2	60	257.5	36.2
11	10.9	01.5	61	60.4	08.5	111	109.9	15.5	161	159.4	22.4	211	209.0	29.4	261	258.5	36.3
12	11.9	01.7	62	61.4	08.6	12	110.9	15.6	62	160.4	22.6	12	209.9	29.5	62	259.5	36.5
13	12.9	01.8	63	62.4	08.8	13	111.9	15.7	63	161.4	22.7	13	210.9	29.6	63	260.4	36.6
14	13.9	01.9	64	63.4	08.9	14	112.9	15.9	64	162.4	22.8	14	211.9	29.8	64	261.4	36.7
15	14.9	02.1	65	64.4	09.0	15	113.9	16.0	65	163.4	23.0	15	212.9	29.9	65	262.4	36.9
16	15.8	02.2	66	65.4	09.2	116	114.9	16.1	166	164.4	23.1	216	213.9	30.1	266	263.4	37.0
17	16.8	02.4	67	66.4	09.3	17	115.9	16.3	67	165.4	23.2	17	214.9	30.2	67	264.4	37.2
18	17.8	02.5	68	67.3	09.5	18	116.9	16.4	68	166.4	23.4	18	215.9	30.3	68	265.4	37.3
19	18.8	02.6	69	68.3	09.6	19	117.8	16.6	69	167.4	23.5	19	216.9	30.5	69	266.4	37.4
20	19.8	02.8	70	69.3	09.7	20	118.8	16.7	70	168.4	23.7	20	217.9	30.6	70	267.4	37.6
21	20.8	02.9	71	70.3	09.9	121	119.8	16.8	171	169.3	23.8	221	218.9	30.8	271	268.4	37.7
22	21.8	03.1	72	71.3	10.0	22	120.8	17.0	72	170.3	23.9	22	219.8	30.9	72	269.4	37.9
23	22.8	03.2	73	72.3	10.2	23	121.8	17.1	73	171.3	24.1	23	220.8	31.0	73	270.4	38.0
24	23.8	03.3	74	73.3	10.3	24	122.8	17.3	74	172.3	24.2	24	221.8	31.2	74	271.3	38.1
25	24.8	03.5	75	74.3	10.4	25	123.8	17.4	75	173.3	24.4	25	222.8	31.3	75	272.3	38.3
26	25.7	03.6	76	75.3	10.6	126	124.8	17.5	176	174.3	24.5	226	223.8	31.5	276	273.3	38.4
27	26.7	03.8	77	76.3	10.7	27	125.8	17.7	77	175.3	24.6	27	224.8	31.6	77	274.3	38.6
28	27.7	03.9	78	77.2	10.9	28	126.8	17.8	78	176.3	24.8	28	225.8	31.7	78	275.3	38.7
29	28.7	04.0	79	78.2	11.0	29	127.7	18.0	79	177.3	24.9	29	226.8	31.9	79	276.3	38.8
30	29.7	04.2	80	79.2	11.1	30	128.7	18.1	80	178.3	25.1	30	227.8	32.0	80	277.3	39.0
31	30.7	04.3	81	80.2	11.3	131	129.7	18.2	181	179.2	25.2	231	228.8	32.2	281	278.3	39.1
32	31.7	04.5	82	81.2	11.4	32	130.7	18.4	82	180.2	25.3	32	229.7	32.3	82	279.3	39.3
33	32.7	04.6	83	82.2	11.6	33	131.7	18.5	83	181.2	25.5	33	230.7	32.4	83	280.3	39.4
34	33.7	04.7	84	83.2	11.7	34	132.7	18.7	84	182.2	25.6	34	231.7	32.6	84	281.2	39.5
35	34.7	04.9	85	84.2	11.8	35	133.7	18.8	85	183.2	25.8	35	232.7	32.7	85	282.2	39.7
36	35.7	05.0	86	85.2	12.0	136	134.7	18.9	186	184.2	25.9	236	233.7	32.9	286	283.2	39.8
37	36.6	05.2	87	86.2	12.1	37	135.7	19.1	87	185.2	26.0	37	234.7	33.0	87	284.2	40.0
38	37.6	05.3	88	87.1	12.2	38	136.7	19.2	88	186.2	26.2	38	235.7	33.1	88	285.2	40.1
39	38.6	05.4	89	88.1	12.4	39	137.7	19.3	89	187.2	26.3	39	236.7	33.3	89	286.2	40.2
40	39.6	05.6	90	89.1	12.5	40	138.6	19.5	90	188.2	26.4	40	237.7	33.4	90	287.2	40.4
41	40.6	05.7	91	90.1	12.7	141	139.6	19.6	191	189.1	26.6	241	238.7	33.5	291	288.2	40.5
42	41.6	05.8	92	91.1	12.8	42	140.6	19.8	92	190.1	26.7	42	239.7	33.7	92	289.2	40.6
43	42.6	06.0	93	92.1	12.9	43	141.6	19.9	93	191.1	26.9	43	240.6	33.8	93	290.2	40.8
44	43.6	06.1	94	93.1	13.1	44	142.6	20.0	94	192.1	27.0	44	241.6	34.0	94	291.1	40.9
45	44.6	06.3	95	94.1	13.2	45	143.6	20.2	95	193.1	27.1	45	242.6	34.1	95	292.1	41.1
46	45.6	06.4	96	95.1	13.4	146	144.6	20.3	196	194.1	27.3	246	243.6	34.2	296	293.1	41.2
47	46.5	06.5	97	96.1	13.5	47	145.6	20.5	97	195.1	27.4	47	244.6	34.4	97	294.1	41.3
48	47.5	06.7	98	97.0	13.6	48	146.6	20.6	98	196.1	27.6	48	245.6	34.5	98	295.1	41.5
49	48.5	06.8	99	98.0	13.8	49	147.6	20.7	99	197.1	27.7	49	246.6	34.7	99	296.1	41.6
50	49.5	07.0	100	99.0	13.9	150	148.5	20.9	200	198.1	27.8	250	247.6	34.8	300	297.1	41.8
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	01.0	00.2	51	50.4	08.0	101	99.8	15.8	151	149.1	23.6	201	198.5	31.4	251	247.9	39.3
2	02.0	00.3	52	51.4	08.1	02	100.7	16.0	52	150.1	23.8	02	199.5	31.6	52	248.9	39.4
3	03.0	00.5	53	52.3	08.3	03	101.7	16.1	53	151.1	23.9	03	200.5	31.7	53	249.9	39.6
4	04.0	00.6	54	53.3	08.4	04	102.7	16.3	54	152.1	24.1	04	201.5	31.9	54	250.9	39.7
5	04.9	00.8	55	54.3	08.6	05	103.7	16.4	55	153.1	24.2	05	202.5	32.1	55	251.9	39.9
6	05.9	00.9	56	55.3	08.8	106	104.7	16.6	156	154.1	24.4	206	203.5	32.2	256	252.9	40.0
7	06.9	01.1	57	56.3	08.9	07	105.7	16.7	57	155.1	24.6	07	204.5	32.4	57	253.8	40.2
8	07.9	01.3	58	57.3	09.1	08	106.7	16.9	58	156.1	24.7	08	205.4	32.5	58	254.8	40.4
9	08.9	01.4	59	58.3	09.2	09	107.7	17.0	59	157.0	24.9	09	206.4	32.7	59	255.8	40.5
10	09.9	01.6	60	59.3	09.4	10	108.6	17.2	60	158.0	25.0	10	207.4	32.8	60	256.8	40.7
11	10.9	01.7	61	60.2	09.5	111	109.6	17.4	161	159.0	25.2	211	208.4	33.0	261	257.8	40.8
12	11.9	01.9	62	61.2	09.7	12	110.6	17.5	62	160.0	25.3	12	209.4	33.2	62	258.8	41.0
13	12.8	02.0	63	62.2	09.9	13	111.6	17.7	63	161.0	25.5	13	210.4	33.3	63	259.8	41.1
14	13.8	02.2	64	63.2	10.0	14	112.6	17.8	64	162.0	25.6	14	211.4	33.5	64	260.8	41.3
15	14.8	02.3	65	64.2	10.2	15	113.6	18.0	65	163.0	25.8	15	212.4	33.6	65	261.7	41.4
16	15.8	02.5	66	65.2	10.3	116	114.6	18.1	166	164.0	26.0	216	213.3	33.8	266	262.7	41.6
17	16.8	02.7	67	66.2	10.5	17	115.6	18.3	67	164.9	26.1	17	214.3	33.9	67	263.7	41.8
18	17.8	02.8	68	67.2	10.6	18	116.5	18.5	68	165.9	26.3	18	215.3	34.1	68	264.7	41.9
19	18.8	03.0	69	68.2	10.8	19	117.5	18.6	69	166.9	26.4	19	216.3	34.3	69	265.7	42.1
20	19.8	03.1	70	69.1	10.9	20	118.5	18.8	70	167.9	26.6	20	217.3	34.4	70	266.7	42.2
21	20.7	03.3	71	70.1	11.1	121	119.5	18.9	171	168.9	26.7	221	218.3	34.6	271	267.7	42.4
22	21.7	03.4	72	71.1	11.3	22	120.5	19.1	72	169.9	26.9	22	219.3	34.7	72	268.7	42.5
23	22.7	03.6	73	72.1	11.4	23	121.5	19.2	73	170.9	27.1	23	220.3	34.9	73	269.6	42.7
24	23.7	03.8	74	73.1	11.6	24	122.5	19.4	74	171.9	27.2	24	221.2	35.0	74	270.6	42.9
25	24.7	03.9	75	74.1	11.7	25	123.5	19.6	75	172.8	27.4	25	222.2	35.2	75	271.6	43.0
26	25.7	04.1	76	75.1	11.9	126	124.5	19.7	176	173.8	27.5	226	223.2	35.3	276	272.6	43.2
27	26.7	04.2	77	76.1	12.0	27	125.4	19.9	77	174.8	27.7	27	224.2	35.5	77	273.6	43.3
28	27.7	04.4	78	77.0	12.2	28	126.4	20.0	78	175.8	27.8	28	225.2	35.7	78	274.6	43.5
29	28.6	04.5	79	78.0	12.4	29	127.4	20.2	79	176.8	28.0	29	226.2	35.8	79	275.6	43.6
30	29.6	04.7	80	79.0	12.5	30	128.4	20.3	80	177.8	28.2	30	227.2	36.0	80	276.6	43.8
31	30.6	04.8	81	80.0	12.7	131	129.4	20.5	181	178.8	28.3	231	228.2	36.1	281	277.5	43.9
32	31.6	05.0	82	81.0	12.8	32	130.4	20.6	82	179.8	28.5	32	229.1	36.3	82	278.5	44.1
33	32.6	05.2	83	82.0	13.0	33	131.4	20.8	83	180.7	28.6	33	230.1	36.4	83	279.5	44.3
34	33.6	05.3	84	83.0	13.1	34	132.4	21.0	84	181.7	28.8	34	231.1	36.6	84	280.5	44.4
35	34.6	05.5	85	84.0	13.3	35	133.3	21.1	85	182.7	28.9	35	232.1	36.8	85	281.5	44.6
36	35.6	05.6	86	84.9	13.5	136	134.3	21.3	186	183.7	29.1	236	233.1	36.9	286	282.5	44.7
37	36.5	05.8	87	85.9	13.6	37	135.3	21.4	87	184.7	29.2	37	234.1	37.1	87	283.5	44.9
38	37.5	05.9	88	86.9	13.8	38	136.3	21.6	88	185.7	29.4	38	235.1	37.2	88	284.5	45.0
39	38.5	06.1	89	87.9	13.9	39	137.3	21.7	89	186.7	29.6	39	236.1	37.4	89	285.4	45.2
40	39.5	06.3	90	88.9	14.1	40	138.3	21.9	90	187.7	29.7	40	237.0	37.5	90	286.4	45.4
41	40.5	06.4	91	89.9	14.2	141	139.3	22.1	191	188.7	29.9	241	238.0	37.7	291	287.4	45.5
42	41.5	06.6	92	90.9	14.4	42	140.3	22.2	92	189.6	30.0	42	239.0	37.8	92	288.4	45.7
43	42.5	06.7	93	91.9	14.5	43	141.2	22.4	93	190.6	30.2	43	240.0	38.0	93	289.4	45.8
44	43.5	06.9	94	92.8	14.7	44	142.2	22.5	94	191.6	30.3	44	241.0	38.2	94	290.4	46.0
45	44.4	07.0	95	93.8	14.9	45	143.2	22.7	95	192.6	30.5	45	242.0	38.3	95	291.4	46.1
46	45.4	07.2	96	94.8	15.0	146	144.2	22.8	196	193.6	30.7	246	243.0	38.5	296	292.4	46.3
47	46.4	07.4	97	95.8	15.2	47	145.2	23.0	97	194.6	30.8	47	244.0	38.6	97	293.3	46.5
48	47.4	07.5	98	96.8	15.3	48	146.2	23.1	98	195.6	31.0	48	244.9	38.8	98	294.3	46.6
49	48.4	07.7	99	97.8	15.5	49	147.2	23 3	99	196.6	31.1	49	245.9	38.9	99	295.3	46.8
50	49.4	07.8	100	98.8	15.6	150	148.2	23.5	200	197.5	31.3	250	246.9	39.1	300	296.3	46.9
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

for 81 Deg.

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	01.0	00.2	51	50.2	08.8	101	99.5	17.5	151	148.7	26.2	201	197.9	34.9	251	247.2	43.5
2	02.0	00.3	52	51.2	09.0	02	100.4	17.7	52	149.7	26.4	02	198.9	35.0	52	248.2	43.7
3	03.0	00.5	53	52.2	09.2	03	101.4	17.9	53	150.7	26.5	03	199.9	35.2	53	249.2	43.9
4	03.9	00.7	54	53.2	09.4	04	102.4	18.0	54	151.7	26.7	04	200.9	35.4	54	250.1	44.0
5	04.9	00.9	55	54.2	09.5	05	103.4	18.2	55	152.6	26.9	05	201.9	35.5	55	251.1	44.2
6	05.9	01.0	56	55.1	09.7	106	104.4	18.4	156	153.6	27.1	206	202.9	35.7	256	252.1	44.4
7	06.9	01.2	57	56.1	09.9	07	105.4	18.6	57	154.6	27.2	07	203.9	35.9	57	253.1	44.6
8	07.9	01.4	58	57.1	10.1	08	106.4	18.7	58	155.6	27.4	08	204.8	36.1	58	254.1	44.7
9	08.9	01.6	59	58.1	10.2	09	107.3	18.9	59	156.6	27.6	09	205.8	36.2	59	255.1	44.9
10	09.8	01.7	60	59.1	10.4	10	108.3	19.1	60	157.6	27.7	10	206.8	36.4	60	256.0	45.1
11	10.8	01.9	61	60.1	10.6	111	109.3	19.2	161	158.6	27.9	211	207.8	36.6	261	257.0	45.3
12	11.8	02.1	62	61.1	10.8	12	110.3	19.4	62	159.5	28.1	12	208.8	36.8	62	258.0	45.4
13	12.8	02.3	63	62.0	10.9	13	111.3	19.6	63	160.5	28.3	13	209.8	36.9	63	259.0	45.6
14	13.8	02.4	64	63.0	11.1	14	112.3	19.8	64	161.5	28.4	14	210.7	37.1	64	260.0	45.8
15	14.8	02.6	65	64.0	11.2	15	113.3	19.9	65	162.5	28.6	15	211.7	37.3	65	261.0	46.0
16	15.8	02.8	66	65.0	11.4	116	114.2	20.1	166	163.5	28.8	216	212.7	37.5	266	262.0	46.1
17	16.7	02.9	67	66.0	11.6	17	115.2	20.3	67	164.5	29.0	17	213.7	37.6	67	262.9	46.3
18	17.7	03.1	68	67.0	11.8	18	116.2	20.5	68	165.4	29.1	18	214.7	37.8	68	263.9	46.5
19	18.7	03.3	69	68.0	12.0	19	117.2	20.6	69	166.4	29.3	19	215.7	38.0	69	264.9	46.6
20	19.7	03.5	70	68.9	12.1	20	118.2	20.8	70	167.4	29.5	20	216.7	38.1	70	265.9	46.8
21	20.7	03.6	71	69.9	12.3	121	119.2	21.0	171	168.4	29.7	221	217.6	38.3	271	266.9	47.0
22	21.7	03.8	72	70.9	12.5	22	120.1	21.2	72	169.4	29.8	22	218.6	38.5	72	267.9	47.2
23	22.7	04.0	73	71.9	12.7	23	121.1	21.3	73	170.4	30.0	23	219.6	38.7	73	268.8	47.3
24	23.6	04.2	74	72.9	12.8	24	122.1	21.5	74	171.4	30.2	24	220.6	38.8	74	269.8	47.5
25	24.6	04.3	75	73.9	13.0	25	123.1	21.7	75	172.3	30.3	25	221.6	39.0	75	270.8	47.7
26	25.6	04.5	76	74.8	13.2	126	124.1	21.8	176	173.3	30.5	226	222.6	39.2	276	271.8	47.9
27	26.6	04.7	77	75.8	13.4	27	125.1	22.0	77	174.3	30.7	27	223.5	39.4	77	272.8	48.0
28	27.6	04.9	78	76.8	13.5	28	126.1	22.2	78	175.3	30.9	28	224.5	39.5	78	273.8	48.2
29	28.6	05.0	79	77.8	13.7	29	127.0	22.4	79	176.3	31.0	29	225.5	39.7	79	274.8	48.4
30	29.5	05.2	80	78.8	13.9	30	128.0	22.5	80	177.3	31.2	30	226.5	39.9	80	275.7	48.6
31	30.5	05.4	81	79.8	14.0	131	129.0	22.7	181	178.2	31.4	231	227.5	40.1	281	276.7	48.7
32	31.5	05.5	82	80.8	14.2	32	130.0	22.9	82	179.2	31.6	32	228.5	40.2	82	277.7	48.9
33	32.5	05.7	83	81.7	14.4	33	131.0	23.1	83	180.2	31.7	33	229.5	40.4	83	278.7	49.1
34	33.5	05.9	84	82.7	14.6	34	132.0	23.2	84	181.2	31.9	34	230.4	40.6	84	279.7	49.2
35	34.5	06.1	85	83.7	14.7	35	132.9	23.4	85	182.2	32.1	35	231.4	40.7	85	280.7	49.4
36	35.5	06.2	86	84.7	14.9	136	133.9	23.6	186	183.2	32.3	236	232.4	40.9	286	281.6	49.6
37	36.4	06.4	87	85.7	15.1	37	134.9	23.8	87	184.2	32.4	37	233.4	41.1	87	282.6	49.8
38	37.4	06.6	88	86.7	15.3	38	135.9	23.9	88	185.1	32.6	38	234.4	41.3	88	283.6	49.9
39	38.4	06.8	89	87.6	15.4	39	136.9	24.1	89	186.1	32.8	39	235.4	41.4	89	284.6	50.1
40	39.4	06.9	90	88.6	15.6	40	137.9	24.3	90	187.1	32.9	40	236.3	41.6	90	285.6	50.3
41	40.4	07.1	91	89.6	15.8	141	138.9	24.4	191	188.1	33.1	241	237.3	41.8	291	286.6	50.5
42	41.4	07.3	92	90.6	16.0	42	139.8	24.6	92	189.1	33.3	42	238.3	42.0	92	287.6	50.6
43	42.3	07.5	93	91.6	16.1	43	140.8	24.8	93	190.1	33.5	43	239.3	42.1	93	288.5	50.8
44	43.3	07.6	94	92.6	16.3	44	141.8	25.0	94	191.0	33.6	44	240.3	42.3	94	289.5	51.0
45	44.3	07.8	95	93.6	16.5	45	142.8	25.1	95	192.0	33.8	45	241.3	42.5	95	290.5	51.2
46	45.3	08.0	96	94.5	16.6	146	143.8	25.3	196	193.0	34.0	246	242.3	42.7	296	291.5	51.3
47	46.3	08.1	97	95.5	16.8	47	144.8	25.5	97	194.0	34.2	47	243.2	42.8	97	292.5	51.5
48	47.3	08.3	98	96.5	17.0	48	145.7	25.7	98	195.0	34.3	48	244.2	43.0	98	293.5	51.7
49	48.3	08.5	99	97.5	17.2	49	146.7	25.8	99	196.0	34.5	49	245.2	43.2	99	294.5	51.8
50	49.2	08.7	100	98.5	17.3	150	147.7	26.0	200	197.0	34.7	250	246.2	43.4	300	295.4	52.0
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	01.0	00.2	51	50.1	09.7	101	99.1	19.3	151	148.2	28.8	201	197.3	38.4	251	246.4	47.9
2	02.0	00.4	52	51.0	09.9	02	100.1	19.5	52	149.2	29.0	02	198.3	38.5	52	247.4	48.1
3	02.9	00.6	53	52.0	10.1	03	101.1	19.7	53	150.2	29.2	03	199.3	38.7	53	248.3	48.3
4	03.9	00.8	54	53.0	10.3	04	102.1	19.8	54	151.2	29.4	04	200.2	38.9	54	249.3	48.5
5	04.9	01.0	55	54.0	10.5	05	103.1	20.0	55	152.1	29.6	05	201.2	39.1	55	250.3	48.7
6	05.9	01.1	56	55.0	10.7	106	104.0	20.2	156	153.1	29.8	206	202.2	39.3	256	251.3	48.8
7	06.9	01.3	57	56.0	10.9	07	105.0	20.4	57	154.1	30.0	07	203.2	39.5	57	252.3	49.0
8	07.9	01.5	58	56.9	11.1	08	106.0	20.6	58	155.1	30.1	08	204.2	39.7	58	253.2	49.2
9	08.8	01.7	59	57.9	11.3	09	107.0	20.8	59	156.1	30.3	09	205.2	39.9	59	254.2	49.4
10	09.8	01.9	60	58.9	11.4	10	108.0	21.0	60	157.1	30.5	10	206.1	40.1	60	255.2	49.6
11	10.8	02.1	61	59.9	11.6	111	109.0	21.2	161	158.0	30.7	211	207.1	40.3	261	256.2	49.8
12	11.8	02.3	62	60.9	11.8	12	109.9	21.4	62	159.0	30.9	12	208.1	40.4	62	257.2	50.0
13	12.8	02.5	63	61.8	12.0	13	110.9	21.6	63	160.0	31.1	13	209.1	40.6	63	258.2	50.2
14	13.7	02.7	64	62.8	12.2	14	111.9	21.8	64	161.0	31.3	14	210.1	40.8	64	259.1	50.4
15	14.7	02.9	65	63.8	12.4	15	112.9	21.9	65	162.0	31.5	15	211.0	41.0	65	260.1	50.6
16	15.7	03.1	66	64.8	12.6	116	113.9	22.1	166	162.9	31.7	216	212.0	41.2	266	261.1	50.8
17	16.7	03.2	67	65.8	12.8	17	114.8	22.3	67	163.9	31.9	17	213.0	41.4	67	262.1	50.9
18	17.7	03.4	68	66.7	13.0	18	115.8	22.5	68	164.9	32.1	18	214.0	41.6	68	263.1	51.1
19	18.7	03.6	69	67.7	13.2	19	116.8	22.7	69	165.9	32.2	19	215.0	41.8	69	264.0	51.3
20	19.6	03.8	70	68.7	13.4	20	117.8	22.9	70	166.9	32.4	20	215.9	42.0	70	265.0	51.5
21	20.6	04.0	71	69.7	13.5	121	118.8	23.1	171	167.9	32.6	221	216.9	42.2	271	266.0	51.7
22	21.6	04.2	72	70.7	13.7	22	119.8	23.3	72	168.8	32.8	22	217.9	42.4	72	267.0	51.9
23	22.6	04.4	73	71.7	13.9	23	120.7	23 5	73	169.8	33.0	23	218.9	42.5	73	268.0	52.1
24	23.6	04.6	74	72.6	14.1	24	121.7	23.7	74	170.8	33.2	24	219.9	42.7	74	269.0	52.3
25	24.5	04.8	75	73.6	14.3	25	122.7	23.9	75	171.8	33.4	25	220.9	42.9	75	269.9	52.5
26	25.5	05.0	76	74.6	14.5	126	123.7	24.0	176	172.8	33.6	226	221.8	43.1	276	270.9	52.7
27	26.5	05.2	77	75.6	14.7	27	124.7	24.2	77	173.7	33.8	27	222.8	43.3	77	271.9	52.9
28	27.5	05.3	78	76.6	14.9	28	125.6	24.4	78	174.7	34.0	28	223.8	43.5	78	272.9	53.0
29	28.5	05.5	79	77.5	15.1	29	126.6	24.6	79	175.7	34.2	29	224.8	43.7	79	273.9	53.2
30	29.4	05.7	80	78.5	15.3	30	127.6	24.8	80	176.7	34.3	30	225.8	43.9	80	274.8	53.4
31	30.4	05.9	81	79.5	15.5	131	128.6	25.0	181	177.7	34.5	231	226.7	44.1	281	275.8	53.6
32	31.4	06.1	82	80.5	15.6	32	129.6	25.2	82	178.6	34.7	32	227.7	44.3	82	276.8	53.8
33	32.4	06.3	83	81.5	15.8	33	130.6	25.4	83	179.6	34.9	33	228.7	44.5	83	277.8	54.0
34	33.4	06.5	84	82.5	16.6	34	131.5	25.6	84	180.6	35.1	34	229.7	44.6	84	278.8	54.2
35	34.4	06.7	85	83.4	16.2	35	132.5	25.8	85	181.6	35.3	35	230.7	44.8	85	279.8	54.4
36	35.3	06.9	86	84.4	16.4	136	133.5	25.9	186	182.6	35.5	236	231.7	45.0	286	280.7	54.6
37	36.3	07.1	87	85.4	16.6	37	134.5	26.1	87	183.6	35.7	37	232.6	45.2	87	281.7	54.8
38	37.3	07.3	88	86.4	16.8	38	135.5	26.3	88	184.5	35.9	38	233.6	45.4	88	282.7	55.0
39	38.3	07.4	89	87.4	17.0	39	136.4	26.5	89	185.5	36.1	39	234.6	45.6	89	283.7	55.1
40	39.3	07.6	90	88.3	17.2	40	137.4	26.7	90	186.5	36.3	40	235.6	45.8	90	284.7	55.3
41	40.2	07.8	91	89.3	17.4	141	138.4	26.9	191	187.5	36.4	241	236.6	46.0	291	285.6	55.5
42	41.2	08.0	92	90.3	17.6	42	139.4	27.1	92	188.5	36.6	42	237.5	46.2	92	286.6	55.7
43	42.2	08.2	93	91.3	17.7	43	140.4	27.3	93	189.4	36.8	43	238.5	46.4	93	287.6	55.9
44	43.2	08.4	94	92.3	17.9	44	141.3	27.5	94	190.4	37.0	44	239.5	46.6	94	288.6	56.0
45	44.2	08.6	95	93.3	18.1	45	142.3	27.7	95	191.4	37.2	45	240.5	46.7	95	289.6	56.3
46	45.2	08.8	96	94.2	18.3	146	143.3	27.9	196	192.4	37.4	246	241.5	47.0	296	290.5	56.5
47	46.1	09.0	97	95.2	18.5	47	144.3	28.0	97	193.4	37.6	47	242.5	47.1	97	291.5	56.7
48	47.1	09.2	98	96.2	18.7	48	145.3	28.2	98	194.4	37.8	48	243.4	47.3	98	292.5	56.9
49	48.1	09.3	99	97.2	18.9	49	146.3	28.4	99	195.4	38.0	49	244.4	47.5	99	293.5	57.0
50	49.1	09.5	100	98.2	19.1	150	147.2	28.6	200	196.3	38.2	250	245.4	47.7	300	294.5	57.2
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

for 79 Deg.

Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep
1	01.0	00.2	51	49.9	10.4	101	98.8	21.0	151	147.7	31.4	201	196.6	41.8	251	245.5	52.2
2	02.0	00.4	52	50.9	10.8	02	99.8	21.2	52	148.7	31.6	02	197.6	42.0	52	246.5	52.4
3	02.9	00.6	53	51.8	11.0	03	100.7	21.4	53	149.6	31.8	03	198.5	42.2	53	247.4	52.6
4	03.9	00.8	54	52.8	11.2	04	101.7	21.6	54	150.6	32.0	04	199.5	42.4	54	248.4	52.8
5	04.9	01.0	55	53.8	11.4	05	102.7	21.8	55	151.6	32.2	05	200.5	42.6	55	249.4	53.0
6	05.9	01.2	56	54.8	11.6	106	103.7	22.0	156	152.6	32.4	206	201.5	42.8	256	250.4	53.2
7	06.8	01.5	57	55.7	11.9	07	104.6	22.3	57	153.5	32.7	07	202.4	43.1	57	251.3	53.5
8	07.8	01.7	58	56.7	12.1	08	105.6	22.5	58	154.5	32.9	08	203.4	43.3	58	252.3	53.7
9	08.8	01.9	59	57.7	12.3	09	106.6	22.7	59	155.5	33.1	09	204.4	43.5	59	253.3	53.9
10	09.8	02.1	60	58.7	12.5	10	107.6	22.9	60	156.5	33.3	10	205.4	43.7	60	254.3	54.1
11	10.8	02.3	61	59.7	12.7	111	108.6	23.1	161	157.5	33.5	211	206.4	43.9	261	255.3	54.3
12	11.7	02.5	62	60.6	12.9	12	109.5	23.3	62	158.4	33.7	12	207.3	44.1	62	256.2	54.5
13	12.7	02.7	63	61.6	13.1	13	110.5	23.5	63	159.4	33.9	13	208.3	44.3	63	257.2	54.7
14	13.7	02.9	64	62.6	13.3	14	111.5	23.7	64	160.4	34.1	14	209.3	44.5	64	258.2	54.9
15	14.7	03.1	65	63.6	13.5	15	112.5	23.9	65	161.4	34.3	15	210.3	44.7	65	259.2	55.1
16	15.6	03.3	66	64.5	13.7	116	113.4	24.1	166	162.3	34.5	216	211.2	44.9	266	260.1	55.3
17	16.6	03.5	67	65.5	13.9	17	114.4	24.3	67	163.3	34.7	17	212.2	45.1	67	261.1	55.5
18	17.6	03.7	68	66.5	14.1	18	115.4	24.5	68	164.3	34.9	18	213.2	45.3	68	262.1	55.7
19	18.6	04.0	69	67.5	14.4	19	116.4	24.8	69	165.3	35.2	19	214.2	45.6	69	263.1	56.0
20	19.6	04.2	70	68.5	14.6	20	117.4	25.0	70	166.3	35.4	20	215.2	45.8	70	264.1	56.2
21	20.5	04.4	71	69.4	14.8	121	118.3	25.2	171	167.2	35.6	221	216.1	46.0	271	265.0	56.4
22	21.5	04.6	72	70.4	15.0	22	119.3	25.4	72	168.2	35.8	22	217.1	46.2	72	266.0	56.6
23	22.5	04.8	73	71.4	15.2	23	120.3	25.6	73	169.2	36.0	23	218.1	46.4	73	267.0	56.8
24	23.5	05.0	74	72.4	15.4	24	121.3	25.8	74	170.2	36.2	24	219.1	46.6	74	268.0	57.0
25	24.5	05.2	75	73.4	15.6	25	122.3	26.0	75	171.2	36.4	25	220.1	46.8	75	269.0	57.2
26	25.4	05.4	76	74.3	15.8	126	123.2	26.2	176	172.1	36.6	226	221.0	47.0	276	269.9	57.4
27	26.4	05.6	77	75.3	16.0	27	124.2	26.4	77	173.1	36.8	27	222.0	47.2	77	270.9	57.6
28	27.4	05.8	78	76.3	16.2	28	125.2	26.6	78	174.1	37.0	28	223.0	47.4	78	271.9	57.8
29	28.4	06.0	79	77.3	16.4	29	126.2	26.8	79	175.1	37.2	29	224.0	47.6	79	272.9	58.0
30	29.3	06.2	80	78.2	16.6	30	127.1	27.0	80	176.0	37.4	30	224.9	47.8	80	273.8	58.2
31	30.3	06.4	81	79.2	16.8	131	128.1	27.2	181	177.0	37.6	231	225.9	48.0	281	274.8	58.4
32	31.3	06.7	82	80.2	17.1	32	129.1	27.5	82	178.0	37.9	32	226.9	48.3	82	275.8	58.7
33	32.3	06.9	83	81.2	17.3	33	130.1	27.7	83	179.0	38.1	33	227.9	48.5	83	276.8	58.9
34	33.3	07.1	84	82.2	17.5	34	131.1	27.9	84	180.0	38.3	34	228.9	48.7	84	277.8	59.1
35	34.2	07.3	85	83.1	17.7	35	132.0	28.1	85	180.9	38.5	35	229.8	48.9	85	278.7	59.3
36	35.2	07.5	86	84.1	17.9	136	133.0	28.3	186	181.9	38.7	236	230.8	49.1	286	279.7	59.5
37	36.2	07.7	87	85.1	18.0	37	134.0	28.5	87	182.9	38.9	37	231.8	49.3	87	280.7	59.7
38	37.2	07.9	88	86.1	18.3	38	135.0	28.7	88	183.9	39.1	38	232.8	49.5	88	281.7	59.9
39	38.1	08.1	89	87.0	18.5	39	135.9	28.9	89	184.8	39.3	39	233.7	49.7	89	282.6	60.1
40	39.1	08.3	90	88.0	18.7	40	136.9	29.1	90	185.8	39.5	40	234.7	49.9	90	283.6	60.3
41	40.1	08.5	91	89.0	18.9	141	137.9	29.3	191	186.8	39.7	241	235.7	50.1	291	284.6	60.5
42	41.1	08.7	92	90.0	19.1	42	138.9	29.5	92	187.8	39.9	42	236.7	50.3	92	285.6	60.7
43	42.1	08.9	93	91.0	19.3	43	139.9	29.7	93	188.8	40.1	43	237.7	50.5	93	286.6	60.9
44	43.0	09.2	94	91.9	19.6	44	140.8	30.0	94	189.7	40.4	44	238.6	50.8	94	287.5	61.2
45	44.0	09.4	95	92.9	19.8	45	141.8	30.2	95	190.7	40.6	45	239.6	51.0	95	288.5	61.4
46	45.0	09.6	96	93.9	20.0	146	142.8	30.4	196	191.7	40.8	246	240.6	51.2	296	289.5	61.6
47	46.0	09.8	97	94.9	20.2	47	143.8	30.6	97	192.7	41.0	47	241.6	51.4	97	290.5	61.8
48	46.9	10.0	98	95.8	20.4	48	144.7	30.8	98	193.6	41.2	48	242.5	51.6	98	291.4	62.0
49	47.9	10.2	99	96.8	20.6	49	145.7	31.0	99	194.6	41.4	49	243.5	51.8	99	292.4	62.2
50	48.9	10.4	100	97.8	20.8	150	146.7	31.2	200	195.6	41.6	250	244.5	52.0	300	293.4	62.4
Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	01.0	00.2	51	49.8	11.5	101	98.4	22.7	151	147.1	34.0	201	195.9	45.2	251	244.6	56.5
2	01.9	00.4	52	50.7	11.7	02	99.4	22.9	52	148.1	34.2	02	196.8	45.4	52	245.5	56.7
3	02.9	00.7	53	51.6	11.9	03	100.4	23.2	53	149.1	34.4	03	197.8	45.7	53	246.5	56.9
4	03.9	00.9	54	52.6	12.1	04	101.3	23.4	54	150.1	34.6	04	198.8	45.9	54	247.5	57.1
5	04.9	01.1	55	53.6	12.4	05	102.3	23.6	55	151.0	34.9	05	199.7	46.1	55	248.5	57.4
6	05.8	01.3	56	54.6	12.6	106	103.3	23.8	156	152.0	35.1	206	200.7	46.3	256	249.4	57.6
7	06.8	01.6	57	55.5	12.8	07	104.3	24.1	57	153.0	35.3	07	201.7	46.6	57	250.4	57.8
8	07.8	01.8	58	56 5	13.0	08	105.2	24.3	58	154.0	35.5	08	202.7	46.8	58	251.4	58.0
9	08.8	02.0	59	57.5	13.3	09	106.2	24.5	59	154.9	35.8	09	203.6	47.0	59	252.4	58.3
10	09.7	02.2	60	58.5	13.5	10	107.2	24.7	60	155.9	36.0	10	204 6	47.2	60	253.3	58.5
11	10.7	02.5	61	59.4	13.7	111	108.2	25.0	161	156.9	36.2	211	205.6	47.5	261	254.3	58.7
12	11.7	02.7	62	60.4	13.9	12	109.1	25.2	62	157.9	36.4	12	206.6	47.7	62	255.3	58.9
13	12.7	02.9	63	61.4	14.2	13	110.1	25.4	63	158.8	36.7	13	207 5	47.9	63	256.3	59.2
14	13.6	03.1	64	62.4	14.4	14	111.1	25.6	64	159.8	36.9	14	208 5	48.1	64	257.2	59.4
15	14.6	03.4	65	63.3	14.6	15	112.1	25.9	65	160.8	37.1	15	209.5	48.4	65	258.2	59.6
16	15.6	03.6	66	64.3	14.8	116	113.0	26.1	166	161.7	37.3	216	210.5	48.6	266	259.2	59.8
17	16.6	03.8	67	65.3	15.1	17	114.0	26.3	67	162.7	37.6	17	211.4	48.8	67	260.2	60.1
18	17.5	04.0	68	66.3	15.3	18	115.0	26.5	68	163.7	37.8	18	212.4	49.0	68	261.1	60.3
19	18.5	04.3	69	67.2	15.5	19	116.0	26.8	69	164.7	38.0	19	213.4	49.3	69	262.1	60.5
20	19.5	04 5	70	68.2	15.7	20	116.9	27.0	70	165.6	38.2	20	214.4	49.5	70	263.1	60.7
21	20.5	04.7	71	69.2	16.0	121	117.9	27.2	171	166.6	38.5	221	215.3	49.7	271	264.1	61.0
22	21.4	04.9	72	70.2	16.2	22	118.9	27.4	72	167.6	38.7	22	216.3	49.9	72	265.0	61.2
23	22.4	05.2	73	71.1	16 4	23	119.8	27.7	73	168.6	38.9	23	217.3	50.2	73	266.0	61.4
24	23.4	05.4	74	72.1	16.6	24	120.8	27.9	74	169.5	39.1	24	218.3	50.4	74	267.0	61.6
25	24.4	05.6	75	73.1	16.9	25	121.8	28.1	75	170.5	39.4	25	219.2	50.6	75	268.0	61.9
26	25.3	05.8	76	74.1	17.1	126	122.8	28.3	176	171.5	39.6	226	220.2	50.8	276	268.9	62.1
27	26.3	06.1	77	75.0	17.3	27	123.7	28.6	77	172.5	39.8	27	221.2	51.1	77	269.9	62.3
28	27.3	06.3	78	76.0	17.5	28	124.7	28.8	78	173 4	40.0	28	222.2	51.3	78	270.9	62.5
29	28.3	06.5	79	77.0	17.8	29	125.7	29.0	79	174.4	40.3	29	223.1	51.5	79	271.9	62.8
30	29.2	06.7	80	78.0	18.0	30	126.7	29.2	80	175.4	40.5	30	224.1	51.7	80	272.8	63.0
31	30.2	07.0	81	78.9	18.2	131	127.6	29.5	181	176.4	40.7	231	225.1	52.0	281	273.8	63.2
32	31.2	07.2	82	79.9	18.4	32	128.6	29.7	82	177.3	40.9	32	226.1	52.2	82	274.8	63.4
33	32.2	07.4	83	80.9	18.7	33	129.6	29.9	83	178.3	41.2	33	227.0	52.4	83	275.8	63.7
34	33.1	07.6	84	81.8	18.9	34	130.6	30.1	84	179.3	41.4	34	228.0	52.6	84	276.7	63.9
35	34.1	07.9	85	82.8	19.1	35	131.5	30.4	85	180.3	41.6	35	229.0	52.9	85	277.7	64.1
36	35.1	08.1	86	83.8	19.3	136	132.5	30.6	186	181.2	41.8	236	230.0	53.1	286	278.7	64.3
37	36.1	08.3	87	84.8	19.6	37	133.5	30.8	87	182.2	42.1	37	230.9	53.3	87	279.6	64.6
38	37.0	08.5	88	85.7	19.8	38	134.5	31.0	88	183.2	42.3	38	231.9	53.5	88	280.6	64.8
39	38.0	08.8	89	86.7	20.0	39	135.4	31.3	89	184.2	42.5	39	232.9	53.8	89	281.6	65.0
40	39.0	09.0	90	87.7	20.2	40	136.4	31.5	90	185.1	42.7	40	233.9	54.0	90	282.6	65.2
41	39.9	09.2	91	88.7	20.5	141	137.4	31.7	191	186.1	43.0	241	234.8	54.2	291	283.5	65.5
42	40.9	09.4	92	89.6	20.7	42	138.4	31.9	92	187.1	43.2	42	235.8	54.4	92	284.5	65.7
43	41.9	09.7	93	90.6	20.9	43	139.3	32.2	93	188.1	43.4	43	236.8	54.7	93	285.5	65.9
44	42.9	09.9	94	91.6	21.1	44	140.3	32.4	94	189.0	43.6	44	237.8	54.9	94	286.5	66.1
45	43.8	10.1	95	92.6	21.4	45	141.3	32.6	95	190.0	43.9	45	238.7	55.1	95	287.4	66.4
46	44.8	10.3	96	93.5	21.6	146	142.3	32.8	196	191.0	44.1	246	239.7	55.3	296	288.4	66.6
47	45.8	10.6	97	94.5	21.8	47	143.2	33.1	97	192.0	44.3	47	240.7	55.6	97	289.4	66.8
48	46.8	10.8	98	95.5	22.0	48	144.2	33.3	98	192.9	44.5	48	241.6	55.8	98	290.4	67.0
49	47.7	11.0	99	96.5	22.3	49	145.2	33.5	99	193.9	44.8	49	242.6	56.0	99	291.3	67.3
50	48.7	11.2	100	97.4	22.5	150	146.2	33.7	200	194.9	45.0	250	243.6	56.2	300	292.3	67.5
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	01.0	00.2	51	49.5	12.3	101	98.0	24.4	151	146.5	36.5	201	195.0	48.6	251	243.5	60.7
2	01.9	00.5	52	50.5	12.6	02	99.0	24.7	52	147.5	36.8	02	196.0	48.9	52	244.5	61.0
3	02.9	00.7	53	51.4	12.8	03	99.9	24.9	53	148.5	37 0	03	197.0	49.1	53	245.5	61.2
4	03.9	01.0	54	52.4	13.1	04	100.9	25.2	54	149.4	37.3	04	197.9	49.4	54	246.4	61.5
5	04.9	01.2	55	53.4	13.3	05	101.9	25.4	55	150.4	37.5	05	198.9	49.6	55	247.4	61.7
6	05.8	01.5	56	54.3	13.6	106	102.8	25.7	156	151.4	37.7	206	199 9	49.9	256	248.4	62.0
7	06.8	01.7	57	55.3	13.8	07	103.8	25.9	57	152.3	38.0	07	200.8	50.1	57	249.4	62.2
8	07.8	01.9	58	56.3	14.0	08	104.8	26.1	58	153.3	38.2	08	201.8	50.3	58	250.3	62.4
9	08.7	02.2	59	57.2	14.3	09	105.8	26.4	59	154.3	38.5	09	202.8	50.6	59	251.3	62.7
10	09.7	02.4	60	58.2	14.5	10	106.7	26.6	60	155.2	38.7	10	203.8	50.8	60	252.3	62.9
11	10.7	02.7	61	59.2	14.8	111	107.7	26.9	161	156.2	39.0	211	204.7	51.1	261	253.2	63.2
12	11.6	02.9	62	60.2	15.0	12	108.7	27.1	62	157.2	39 2	12	205.7	51.3	62	254.2	63.4
13	12.6	03.1	63	61.1	15.2	13	109.6	27.3	63	158.2	39.4	13	206.7	51.5	63	255.2	63.6
14	13.6	03.4	64	62.1	15.5	14	110.6	27.6	64	159.1	39.7	14	207.6	51.8	64	256.2	64.8
15	14.6	03.6	65	63.1	15.7	15	111.6	27.8	65	160.1	39.9	15	208.6	52 0	65	257.1	64.1
16	15.5	03.9	66	64.0	16.0	116	112.6	28.1	166	161.1	40.2	216	209.6	52.3	266	258.1	64.4
17	16.5	04.1	67	65.0	16.2	17	113.5	28.3	67	162.0	40.4	17	210.5	52 5	67	259.1	64.6
18	17.5	04.4	68	66.0	16.0	18	114.5	28.6	68	163.0	40.7	18	211.5	52.8	68	260.0	64.9
19	18.4	04.6	69	66.9	16.7	19	115.5	28.8	69	164.0	40.9	19	212.5	53.0	69	261.0	65.1
20	19.4	04.8	70	67.9	16.9	20	116.4	29.0	70	164.9	41,1	20	213.5	53.2	70	262 0	65.3
21	20.4	05.1	71	68.9	17.2	121	117.4	29.3	171	165.9	41.4	221	214.4	43.5	271	262 9	65.6
22	21.3	05.3	72	69.8	17.4	22	118.4	29.5	72	166.9	41.6	22	215.4	53.7	72	263.9	66.8
23	22.3	05.6	73	70.8	17.7	23	119.3	29.8	73	167.9	41.9	23	216.4	54.0	73	264.9	66.1
24	23.3	05.8	74	71.8	17.9	24	120.3	30.0	74	168.8	42.1	24	217.3	54.2	74	265.9	66.3
25	24.3	06.0	75	72.8	18.1	25	121.3	30.2	75	169.8	42.3	25	218.3	54 4	75	266.8	66.5
26	25.2	06.3	76	73.7	18.4	126	122.3	30.5	176	170.8	42.6	226	219.3	54.7	276	267.8	66.8
27	26.2	06.5	77	74.7	18.6	27	123.2	30.7	77	171.7	42.8	27	220.3	54.9	77	268.8	67.0
28	27.2	06.8	78	75.7	18.9	28	124.2	31,0	78	172.7	43.1	28	221.2	55.2	78	269.7	67.3
29	28.1	07.0	79	76.7	19.1	29	125.2	31.2	79	173.7	43.3	29	222.2	55.4	79	270.7	67.5
30	29.1	07.3	80	77.6	19.4	30	126.1	31.5	80	174.6	43.6	30	223.2	55.7	80	271.7	67.8
31	30.1	07.5	81	78.6	19.6	131	127.1	31.7	181	175.6	43.8	231	224.1	55.9	281	272.6	68.0
32	31.0	07.7	82	79.6	19.8	32	128.1	32.9	82	176.6	44.0	32	225.1	56.1	82	273.6	68.2
33	32.0	08.0	83	80.5	20.1	33	129.0	32.2	83	177.6	44.3	33	226.1	66.4	83	274.6	68.5
34	33.0	08.2	84	81.5	20.3	34	130.0	32.4	84	178.5	44.5	34	227.0	56.6	84	275.6	68.7
35	34.0	08.5	85	82.5	20.6	35	131.0	32.7	85	179.5	44.8	35	228.0	56.9	85	276.5	69.0
36	34.9	08.7	86	83.4	20.8	136	132.0	32.9	186	180.5	45.0	236	229.0	57.1	286	277.5	69.2
37	35.9	09.0	87	84.4	21.1	37	132.9	33.2	87	181.4	45.3	37	230.0	57.4	87	278.5	69.5
38	36.9	09.2	88	85.4	21.3	38	133.9	33.4	88	182.4	45.5	38	230.9	57.6	88	279.4	69.7
39	37.8	09.4	89	86.4	21.5	39	134.9	33.6	89	183.4	45.7	39	231.9	57.8	89	280.4	69.9
40	38.8	09.7	90	87.3	21.8	40	135.8	33.9	90	184.4	46.0	40	232.9	58.1	90	281.4	70.2
41	39.8	19.9	91	88.3	22.0	141	136.8	34.1	191	185.3	46.2	241	233.8	58.3	291	282.3	70.4
42	40.8	10.2	92	89.3	22.3	42	137.7	34.4	92	186.3	46.5	42	234.8	58.6	92	283.3	70.7
43	41.7	10.4	93	90.2	22.5	43	138.7	34.6	93	187.3	46.7	43	235.8	58.8	93	284.3	70.9
44	42.7	10.6	94	91.2	22.7	44	139.7	34.8	94	188.2	76.9	44	236.7	59.0	94	285.3	71.1
45	43.7	10 9	95	92.2	23.0	45	140.7	35.1	95	189.2	47.2	45	237.7	59.3	95	286.2	71.4
46	44.6	11.1	96	93.1	23.2	146	141.7	35.3	196	190.2	47.4	246	238.7	59.5	296	287.2	71.6
47	45.6	11.4	97	94.1	23.5	47	142.6	35.6	97	191.1	47.7	47	239.7	59.8	97	288.2	71.9
48	46.6	11.6	98	95.1	23.7	48	143.6	35.8	98	192.1	47.9	48	240.6	60.0	98	289.1	72.1
49	47.5	11.9	99	96.1	24.0	49	144.6	36.1	99	193.1	48.2	49	241.6	60.3	99	290.1	72.4
50	48.5	12.1	100	97.0	24 2	150	145.5	36.3	200	194.1	48.4	250	242.6	60.5	300	291.1	72.6
Dist	Dep	Lat	Dip	Dep	Lat	Dist	Dett	Lat	Dist	Dep	Lat.	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	01.0	00.3	51	49.3	13.2	101	97.6	26.1	151	145.8	39.1	201	194.1	52.0	251	242.4	65.0
2	01.9	00.5	52	50.2	13.5	02	98.5	26.4	52	146.8	39.3	02	195.1	52.3	52	243.4	65.2
3	02.9	00.8	53	51.2	13.7	03	99.5	26.7	53	147.8	39.6	03	196.1	52.5	53	244.4	65.5
4	03.9	01.0	54	52.2	14.0	04	100.5	26.9	54	148.7	39.9	04	197.0	52.8	54	245.3	65.7
5	04.8	01.3	55	53.1	14.2	05	101.4	27.2	55	149.7	40.1	05	198.0	53.1	55	246.3	66.0
6	05.8	01.6	56	54.1	14.5	106	102.4	27.4	156	150.7	40.4	206	199.0	53.3	256	247.3	66.3
7	06.8	01.8	57	55.1	14.8	07	103.4	27.7	57	151.6	40.6	07	199.9	53.6	57	248.2	66.5
8	07.7	02.1	58	56.0	15.0	08	104.3	28.0	58	152.6	40.9	08	200.9	53.8	58	249.2	66.8
9	08.7	02.3	59	57.0	15.3	09	105.3	28.2	59	153.6	41.1	09	201.9	54.1	59	250.2	67.0
10	09.7	02.6	60	58.0	15.5	10	106.2	28.5	60	154.5	41.4	10	202.8	54.3	60	251.1	67.3
11	10.6	02.8	61	58.9	15.8	111	107.2	28.7	161	155.5	41.7	211	203.8	54.6	261	252.1	67.5
12	11.6	03.1	62	59.9	16.0	12	108.2	29.0	62	156.5	41.9	12	204.8	54.9	62	253.1	67.8
13	12.6	03.4	63	60.9	16.3	13	109.1	29.2	63	157.4	42.2	13	205.7	55.1	63	254.0	68.1
14	13.5	03.6	64	61.8	16.6	14	110.1	29.5	64	158.4	42.4	14	206.7	55.4	64	255.0	68.3
15	14.5	03.9	65	62.8	16.8	15	111.1	29.8	65	159.4	42.7	15	207 7	55.6	65	256.0	68.6
16	15.5	04.1	66	63.7	17.1	116	112.0	30.0	166	160.3	43.0	216	208.6	55.9	266	256.9	68.8
17	16.4	04.4	67	64.7	17.3	17	113.0	30.3	67	161.3	43.2	17	209.6	56.1	67	257.9	69.1
18	17.4	04.7	68	65.7	17.6	18	114.0	30.5	68	162.3	43.5	18	210.6	56.4	68	258.9	69.4
19	18.4	04.9	69	66.6	17.9	19	114.9	30.8	69	163.2	43.7	19	211.5	56.7	69	259.8	69.6
20	19.3	05.2	70	67.6	18.1	20	115.9	31.1	70	164.2	44 0	20	212.5	56.9	70	260.8	69.9
21	20.3	05.4	71	68.6	18.4	121	116.9	31.3	171	165.2	44.3	221	213.5	57.2	271	261.8	70.1
22	21.2	05.7	72	69.5	18.6	22	117.8	31.6	72	166.1	44.5	22	214.4	57.5	72	262.7	70.4
23	22.2	06.0	73	70.5	18.9	23	118.8	31.8	73	167.1	44.8	23	215.4	57.7	73	263.7	70.7
24	23.2	06.2	74	71.5	19.2	24	119.8	32.1	74	168.1	45.0	24	216.4	58.0	74	264.7	70.9
25	24.1	06.5	75	72.4	19 4	25	120.7	32.4	75	169.0	45.3	25	217.3	58.2	75	265.6	71.2
26	25.1	06.7	76	73.4	19.7	126	121.7	32.6	176	170.0	45.5	226	218.3	58.5	276	266.6	71.4
27	26.1	07.0	77	74.4	19.9	27	122.7	32.9	77	171.0	45.8	27	219.3	58.7	77	267.6	71.7
28	27.0	07.2	78	75.3	20.2	28	123.6	33.1	78	171.9	46.1	28	220.2	59.0	78	268.5	71.9
29	28.0	07.5	79	76.3	20.4	29	124.6	33.4	79	172.9	46.3	29	221.2	59.3	79	269.5	72.2
30	29.0	07.8	80	77.3	20.7	30	125.6	33.6	80	173.9	46.6	30	222.2	59.5	80	270.5	72.5
31	29.9	08.0	81	78.2	21.0	131	126.5	33.9	181	174.8	46.8	231	223.1	59.8	281	271.4	72.7
32	30.9	08.3	82	79.2	21.2	32	127.5	34.2	82	175.8	47.1	32	224.1	60.0	82	272.4	73.0
33	31.9	08.5	83	80.2	21.5	33	128.5	34.4	83	176.8	47.4	33	225.1	60.3	83	273.4	73.2
34	32.8	08.8	84	81.1	21.7	34	129.4	34.7	84	177.7	47.6	34	226.0	60.6	84	274.3	73.5
35	33.8	09.1	85	82.1	22.0	35	130.4	34.9	85	178.7	47.9	35	227.0	60.8	85	275.3	73.8
36	34.8	09.3	86	83.1	22.3	136	131.4	35.2	186	179.7	48.1	236	228 0	61.1	286	276.2	74.0
37	35.7	09.6	87	84.0	22.5	37	132.3	35.5	87	180.6	48.4	37	228.9	61.3	87	277.2	74.3
38	36.7	09.8	88	85.0	22.8	38	133.3	35.7	88	181.6	48.7	38	229.9	61.6	88	278.2	74.5
39	37.7	10.1	89	86.0	23.0	39	134.3	36.0	89	182.6	48 9	39	230.9	61.9	89	279.1	74.8
40	38.6	10.4	90	86.9	23.3	40	135.2	36.2	90	183.5	49.2	40	231.8	62.1	90	280.1	75.0
41	39.6	10.6	91	87.9	23.6	141	136.2	36.5	191	184.5	49.4	241	232.8	62.4	291	281.1	75.3
42	40.6	10.9	92	88.9	23.8	42	137.2	36.7	92	185.5	49.7	42	233.7	62.6	92	282.0	75.6
43	41.5	11.1	93	89.8	24.1	43	138.1	37.0	93	186.4	49.9	43	234.7	62.9	93	283.0	75.8
44	42.5	11.4	94	90.8	24.3	44	139.1	37.3	94	187.4	50.2	44	235.7	63.1	94	284.0	76.1
45	43.5	11.6	95	91.8	24.6	45	140.1	37.5	95	188.4	50.5	45	236.6	63.4	95	284.9	76.3
46	44.4	11.9	96	92.7	24.8	146	141.0	37.8	196	189.3	50.7	246	237.6	63.7	296	285.9	76.6
47	45.4	12.2	97	93.7	25.1	47	142.0	38.0	97	190.3	51 0	47	238.6	63.9	97	286.9	76.9
48	46.4	12.4	98	94.7	25.4	48	143.0	38.3	98	191.2	51.2	48	239.5	64.2	98	287.8	77.1
49	47.3	12.7	99	95.6	25.6	49	143.9	38.6	99	192.2	51.5	49	240.5	64.4	99	288.8	77.4
50	48.3	12.9	100	96.6	25.9	150	144.9	38.8	200	193.2	51.8	250	241.5	64.7	300	289.8	77.6
Dist	Dep.	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep
1	01.0	00.3	51	49.0	14.1	101	97.1	27.8	151	145.1	41.6	201	193.2	55.4	251	241.2	69.2
2	01.9	00.6	52	50.0	14.3	02	98.0	28.1	52	146.1	41.9	02	194.1	55.7	52	242.2	69.5
3	02.9	00.8	53	50.9	14.6	03	99.0	28.4	53	147.1	42.2	03	195.1	55.9	53	243.2	69.7
4	03.8	01.1	54	51.9	14.9	04	100.0	28.7	54	148.0	42.4	04	196.1	56.2	54	244.1	70.0
5	04.8	01.4	55	52.9	15.2	05	100.9	28.9	55	149.0	42.7	05	197 0	56.5	55	245.1	70.3
6	05.8	01.7	56	53.8	15.4	106	101.9	29.2	156	149.9	43.0	206	198.0	56.8	256	246.0	70.6
7	06.7	01 9	57	54.8	15.7	07	102.8	29.5	57	150.9	43.3	07	199 0	57.0	57	247.0	70.8
8	07.7	02.2	58	55.7	16.0	08	103.8	29.8	58	151.9	43.5	08	199.9	57.3	58	248.0	71.1
9	08.7	02.5	59	56.7	16.3	09	104.8	30.0	59	152.8	43.8	09	200.9	57.6	59	248.9	71.4
10	09.6	02.8	60	57.7	16.5	10	105.7	30.3	60	153.8	44.1	10	201.8	57.9	60	249.9	71.7
11	10.6	03.0	61	58.6	16.8	111	106.7	30.6	161	154.7	44.4	211	202.8	58.2	261	250.9	71.9
12	11.5	03.3	62	59.6	17.1	12	107.6	30.9	62	155.7	44.6	12	203.8	58.4	62	251.8	72.2
13	12.5	03.6	63	60.6	17.4	13	108.6	31,1	63	156.7	44.9	13	204.7	58.7	63	252.8	72.5
14	13.5	03.9	64	61.5	17.6	14	109.6	31.4	64	157.6	45.2	14	205.7	59.0	64	253.7	72.8
15	14.4	04.1	65	62.5	17.9	15	110.5	31.7	65	158.6	45.5	15	206.6	59.3	65	254.7	73.0
16	15.4	04.4	66	63.4	18.2	116	111.5	32.0	166	159.5	45.7	216	207.6	59.5	266	255.7	73.3
17	16.3	04.7	67	64.4	18.5	17	112.5	32.2	67	160.5	46.0	17	208.6	59.8	67	256.6	73.6
18	17.3	05.0	68	65.4	18.7	18	113.4	32.5	68	161.5	46.3	18	209.5	60.1	68	257.6	73.9
19	18.3	05.2	69	66.3	19.0	19	114.4	32.8	69	162.4	46.6	19	210.5	60.4	69	258.5	74.1
20	19.2	05.5	70	67.3	19.3	20	115.3	33.1	70	163.4	46.9	20	211.4	60.6	70	259.5	74.4
21	20.2	05.8	71	68.2	19.6	121	116.3	33.3	171	164.4	47.1	221	212.4	60.9	271	260.5	74.7
22	21.1	06.1	72	69.2	19.8	22	117.3	33.6	72	165.3	47.4	22	213.4	61.2	72	261.4	75.0
23	22.1	06.3	73	70.2	20.1	23	118.2	33.9	73	166.3	47.7	23	214.3	61.5	73	262.4	75.2
24	23.1	06.6	74	71.1	20.4	24	119.2	34.2	74	167.2	48.0	24	215.3	61.7	74	263.3	75.5
25	24.0	06.9	75	72.1	20.7	25	120.1	34.4	75	168.2	48.2	25	216.3	62.0	275	264.3	75.8
26	25.0	07.2	76	73.0	20.9	126	121.1	34.7	176	169.2	48.5	226	217.2	62.3	276	265.3	76.1
27	26.0	07.4	77	74.0	21.2	27	122.1	35.0	77	170.1	48.8	27	218.2	62.6	77	266.2	76.3
28	26.9	07.7	78	75.0	21.5	28	123.0	35.3	78	171.1	49.1	28	219.1	62.8	78	267.2	76.6
29	27.9	08.0	79	75.9	21.8	29	124.0	35.6	79	172.0	49.3	29	220.1	63.1	79	268.2	76.9
30	28.8	08.3	80	76.9	22.0	30	124.9	35.8	80	173.0	49.6	30	221.1	63.4	80	269.1	77.2
31	29.8	08.5	81	77.9	22.3	131	125.9	36.1	181	174.0	49.9	231	222.0	63.7	281	270.1	77.4
32	30.8	08.8	82	78.8	22.6	32	126.9	36.4	82	174.9	50.2	32	223.0	63.9	82	271.0	77.7
33	31.7	09.1	83	79.8	22.9	33	127.8	36.7	83	175.9	50.4	33	223.9	64.2	83	272.0	78.0
34	32.7	09.4	84	80.7	23.1	34	128.8	36.9	84	176.8	50.7	34	224.9	64.5	84	273.0	78.3
35	33.6	09.6	85	81.7	23.4	35	129.8	37.2	85	177.8	51.0	35	225.9	64.8	85	273.9	78.5
36	34.6	09.9	86	82.7	23.7	136	130.7	37.5	186	178.8	51.3	236	226.8	65.0	286	274.9	78.8
37	35.6	10.2	87	83.6	24.0	37	131.7	37.8	87	179.7	51.5	37	227.8	65.3	87	275.8	79 1
38	36.5	10.5	88	84.6	24.3	38	132 6	38.0	88	180.7	51.8	38	228.7	65.6	88	276.8	79.4
39	37.5	10.7	89	85.5	24.5	39	133.6	38.3	89	181.7	52.1	39	229.7	65.9	89	277.8	79.6
40	38.4	11.0	90	86.5	24.8	40	134.6	38.6	90	182.6	52,4	40	230.7	66.1	90	278.7	79.9
41	39.4	11.3	91	87.5	25.1	141	135.5	38.9	191	183 6	52.6	241	231.6	66.4	291	279.7	80.2
42	40.4	11.6	92	88.4	25.4	42	136.5	39.1	92	184.5	52.9	42	232.6	66.7	92	280.6	80 5
43	41.3	11.9	93	89.4	25.6	43	137.4	39.4	93	185.5	53.2	43	233.6	67.0	93	281.6	80.8
44	42.3	12.1	94	90.3	25.9	44	138.4	39.7	94	186.5	53.5	44	234.5	67.2	94	282.6	81.0
45	43.3	12.4	95	91.3	26.2	45	139.4	40.0	95	187.4	53.7	45	235.5	67.5	95	283.5	81.3
46	44.2	12.7	96	92.3	26,5	146	140.3	40.2	196	188.4	54.0	246	236.4	67.8	296	284.5	81.6
47	45.2	13.0	97	93.2	26.7	47	141.3	40.5	97	189.3	54.3	47	237.4	68.1	97	285.5	81.9
48	46.1	13.2	98	94.2	27.0	48	142.7	40.8	98	190.3	54.6	48	238.4	68.3	98	286.4	82.1
49	47.1	13.5	99	95.2	27.3	49	143.2	41.1	99	191.3	54.8	49	239.3	68.6	99	287.4	82.4
50	48.1	13.8	100	96.1	27.6	150	144.2	41.3	200	192.2	55.1	250	240.3	68.9	300	288.3	82.7
Diff	Dep	Lat	Dip	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat.	Diff	Dep	Lat	Diff	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	01.0	00.3	51	48.8	14.9	101	96.6	29.5	151	144.4	44.1	201	192.2	58.8	251	240.0	73.3
2	01.9	00.6	52	49.7	15.2	02	97.5	29.8	52	145.3	44.4	02	193.2	59.0	52	241.0	73.6
3	02.9	00.9	53	50.7	15.5	03	98.5	30.1	53	146.3	44.7	03	194.1	59.3	53	241.9	73.9
4	03.8	01.2	54	51.6	15.8	04	99.4	30.4	54	147.3	45.0	04	195.1	59.6	54	242.9	74.1
5	04.8	01.5	55	52.6	16.1	05	100.4	30.7	55	148.2	45.3	05	196.0	59.9	55	243.8	74.4
6	05.7	01.8	56	53.5	16.4	106	101.4	31.0	156	149.2	45.6	206	197.0	60.2	256	244.8	74.7
7	06.7	02.0	57	54.5	16.7	07	102.3	31.3	57	150.1	45.9	07	197.9	60.5	57	245.8	75.0
8	07.6	02.3	58	55.5	17.0	08	103.3	31.6	58	151.1	46.2	08	198.9	60.8	58	246.7	75.3
9	08.6	02.6	59	56.4	17.2	09	104.2	31.9	59	152.0	46.5	09	199.9	61.1	59	247.7	75.6
10	09.6	02.9	60	57.4	17.5	10	105.2	32.2	60	153.0	46.8	10	200.8	61.4	60	248.6	75.9
11	10.5	03.2	61	58.3	17.8	111	106.1	32.4	161	154.0	47.1	211	201.8	61.7	261	249.6	76.2
12	11.5	03.5	62	59.3	18.1	12	107.1	32.7	62	154.9	47.4	12	202.7	62.0	62	250.5	76.5
13	12.4	03.8	63	60.2	18.4	13	108.1	33.0	63	155.9	47.6	13	203.7	62.3	63	251.5	76.8
14	13.4	04.1	64	61.2	18.7	14	109.0	33.3	64	156.8	47.9	14	204.6	62.6	64	252.4	77.1
15	14.3	04.4	65	62.2	19.0	15	110.0	33.6	65	157.8	48.2	15	205.6	62.8	65	253.4	77.4
16	15.3	04.7	66	63.1	19.3	116	100.9	33.9	166	158.7	48.5	216	206.5	63.1	266	254.4	77.7
17	16.3	05.0	67	64.1	19.6	17	111.9	34.2	67	159.7	48.8	17	207.5	63.4	67	255.3	77.9
18	17.2	05.3	68	65.0	19.9	18	112.8	34.5	68	160.6	49.1	18	208.5	63.7	68	256.3	78.2
19	18.2	05.6	69	66.0	20.2	19	113.8	34.8	69	161.6	49.4	19	209.4	64.0	69	257.2	78.5
20	19.1	05.8	70	66.9	20.5	20	114.7	35.1	70	162.6	49.7	20	210.4	64.3	70	258.2	78.8
21	20.1	06.1	71	67.9	20.8	121	115.7	35.4	171	163.5	50.0	221	211.3	64.6	271	259.1	79.1
22	21.0	06.4	72	68.8	21.0	22	116.7	35.7	72	164.5	50.3	22	212.3	64.9	72	250.1	79.4
23	22.0	06.7	73	69.8	21.3	23	117.6	36.0	73	165.4	50.6	23	213.2	65.2	73	261.1	79.7
24	22.9	07.0	74	70.8	21.6	24	118.6	36.2	74	166.4	50.9	24	214.2	65.5	74	262.0	80.0
25	23.9	07.3	75	71.7	21.9	25	119.5	36.5	75	167.3	51.2	25	215.2	65.8	75	263.0	80.3
26	24.9	07.6	76	72.7	22.2	126	120.5	36.8	176	168.3	51.4	226	216.1	66.1	276	263.9	80.6
27	25.8	07.9	77	73.6	22.5	27	121.4	37.1	77	169.3	51.7	27	217.1	66.4	77	264.9	80.9
28	26.8	08.2	78	74.6	22.8	28	122.4	37.4	78	170.2	52.0	28	218.0	66.9	78	265.8	81.2
29	27.7	08.5	79	75.5	23.1	29	123.4	37.7	79	171.2	52.3	29	219.0	66.9	79	266.8	81.5
30	28.7	08.8	80	76.5	23.4	30	124.3	38.0	80	172.1	52.6	30	219.9	67.2	80	267.7	81.7
31	29.6	09.1	81	77.5	23.7	131	125.3	38.3	181	173.1	52.9	231	220.9	67.5	281	268.7	82.0
32	30.6	09.4	82	78.4	24.0	32	126.2	38.6	82	174.0	53.2	32	221.8	67.8	82	269.7	82.3
33	31.6	09.6	83	79.4	24.3	33	127.2	38.9	83	175.0	53.5	33	222.8	68.1	83	270.6	82.6
34	32.5	09.9	84	80.3	24.6	34	128.1	39.2	84	175.9	53.8	34	223.8	68.4	84	271.6	82.9
35	33.5	10.2	85	81.3	24.8	35	129.1	39.5	85	176.9	54.1	35	224.7	68.7	85	272.5	83.2
36	34.4	10.5	86	82.2	25.1	136	130.0	39.8	186	177.9	54.4	236	225.7	69.0	286	273.5	83.5
37	35.4	10.8	87	83.2	25.4	37	131.0	40.0	87	178.8	54.7	37	226.6	69.3	87	274.4	83.8
38	36.3	11.1	88	84.1	25.7	38	132.0	40.3	88	179.8	55.0	38	227.6	69.6	88	275.4	84.1
39	37.3	11.4	89	85.1	26.0	39	132.9	40.6	89	180.7	55.2	39	228.5	69.9	89	276.4	84.4
40	38.2	11.7	90	86.1	26.3	40	133.9	40.9	90	181.7	55.5	40	229.5	70.2	90	277.3	84.7
41	39.2	12.0	91	87.0	26.6	141	134.8	41.2	191	182.6	55.8	241	230.5	70.4	291	278.3	85.0
42	40.2	12.3	92	88.0	26.9	42	135.8	41.5	92	183.6	56.1	42	231.4	70.7	92	279.2	85.3
43	41.1	12.6	93	88.9	27.2	43	136.7	41.8	93	184.6	56.4	43	232.4	71.0	93	280.2	85.5
44	42.1	12.9	94	89.9	27.5	44	137.7	42.1	94	185.5	56.7	44	233.3	71.3	94	281.1	85.8
45	43.0	13.2	95	90.8	27.8	45	138.7	42.4	95	186.5	57.0	45	234.3	71.6	95	282.1	86.1
46	44.0	13.4	96	91.8	28.1	146	139.6	42.7	196	187.4	57.3	246	235.2	71.9	296	283.0	86.4
47	44.9	13.7	97	92.8	28.4	47	140.6	43.0	97	188.4	57.6	47	236.2	72.1	97	284.0	86.7
48	45.9	14.0	98	93.7	28.6	48	141.5	43.3	98	189.3	57.9	48	237.1	72.4	98	285.0	87.0
49	46.9	14.3	99	94.7	28.9	49	142.5	43.6	99	190.3	58.2	49	238.1	72.7	99	285.9	87.3
50	47.8	14.6	100	95.6	29.2	150	143.4	43.8	200	191.2	58.5	250	239.1	73.0	300	286.9	87.6
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

for 73 Deg.

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	01.0	00.3	51	48.5	15.8	101	96.1	31.2	151	143.6	46.7	201	191.2	62.1	251	238.7	77.6
2	01.9	00.6	52	49.5	16.1	02	97.0	31.5	52	144.6	47.0	02	192.1	62.4	52	239.7	77.9
3	02.9	00.9	53	50.4	16.4	03	98.0	31.8	53	145.5	47.3	03	193.1	62.7	53	240.6	78.2
4	03.8	01.2	54	51.4	16.7	04	98.9	32.1	54	146.5	47.6	04	194.0	63.0	54	241.6	78 5
5	04.8	01.5	55	52.3	17.0	05	99.9	32.4	55	147.4	47.9	05	195.0	63.3	55	242.5	78.8
6	05.7	01.9	56	53.3	17.3	106	100.8	32.8	156	148.4	48.2	206	195.9	63.7	256	243.5	79.1
7	06.7	02.2	57	54.2	17.6	07	101.8	33.1	57	149.3	48.5	07	196.9	64.0	57	244.4	79.4
8	07.6	02.5	58	55.2	17.9	08	102.7	33.4	58	150.3	48.8	08	197.8	64.3	58	245.4	79.7
9	08.6	02.8	59	56 1	18.2	09	103.7	33.7	59	151.2	49.1	09	198.8	64.6	59	246.3	80.0
10	09.5	03.1	60	57.1	18.5	10	104.6	34.0	60	152.2	49.4	10	199.7	64.9	60	247.3	80.3
11	10.5	03.4	61	58.0	18.8	111	105.6	34.3	161	153.1	49.7	211	200.7	65.2	261	248.2	80.6
12	11.4	03.7	62	59.0	19.2	12	106.5	34.6	62	154.1	50.1	12	201.6	65.5	62	249.2	81.0
13	12.4	04.0	63	59.9	19.5	13	107.5	34.9	63	155.0	50.4	13	202.6	65.8	63	250.1	81.3
14	13.3	04.3	64	60.9	19.8	14	108.4	35.2	64	156.0	50.7	14	203.5	66.1	64	251.1	81.6
15	14.3	04.6	65	61.8	20.1	15	109.4	35.5	65	156.9	51.0	15	204.5	66.4	65	252.0	81.9
16	15.2	04.9	66	62.8	20.4	116	110.3	35.8	166	157.9	51.3	216	205.4	66.7	266	253.0	82.2
17	16.2	05.3	67	63.7	20.7	17	111.3	36.2	67	158.8	51.6	17	206.4	67.1	67	253.9	82.5
18	17.1	05.6	68	64.7	21.0	18	112.2	36.5	68	159.8	51.9	18	207 3	67.4	68	254.9	82.8
19	18.1	05.9	69	65.6	21.3	19	113.2	36.8	69	160.7	52.2	19	208.3	67.7	69	255.8	83.1
20	19.0	06.2	70	66.6	21.6	20	114.1	37.1	70	161.7	52.5	20	209.2	68.0	70	256.8	83.4
21	20.0	06.5	71	67.5	21.9	121	115.1	37.4	171	162.6	52.8	221	210.2	68.3	271	257.7	83.7
22	20.9	06.8	72	68.5	22.2	22	116.0	37.7	72	163.6	53.1	22	211.1	68.6	72	258.7	84.0
23	21.9	07.1	73	69.4	22.6	23	117.0	38.0	73	164.5	53.5	23	212.1	68.9	73	259.6	84.4
24	22.8	07.4	74	70.4	22.9	24	117.9	38.3	74	165.5	53.8	24	213.0	69.2	74	260.6	84.7
25	23.8	07.7	75	71.3	23.2	25	118.9	38.6	75	166.4	54.1	25	214.0	69.5	75	261.5	85.0
26	24.7	08.0	76	72.3	23.5	126	119.8	38.9	176	167.4	54.4	226	214.9	69.8	276	262.5	85.3
27	25.7	08.3	77	73.2	23.8	27	120.8	39.2	77	168.3	54.7	27	215.9	70.1	77	263.4	85.6
28	26.6	08.7	78	74.2	24.1	28	121.7	39.6	78	169.3	55.0	28	216.8	70.5	78	264.4	85.9
29	27.6	09.0	79	75.1	24.4	29	122.7	39.9	79	170.2	55.3	29	217.8	70.8	79	265.3	86.2
30	28.5	09.3	80	76.1	24.7	30	123.6	40.2	80	171.2	55.6	30	218.7	71.1	80	266.3	86.5
31	29.5	09.6	81	77.0	25.0	131	124.6	40.5	181	172.1	55.9	231	219.7	71.4	281	267.2	86.8
32	30.4	09.9	82	78.0	25.3	32	125.5	40.8	82	173.1	56.2	32	220.6	71.7	82	268.2	87.1
33	31.4	10.2	83	78.9	25.6	33	126.5	41.1	83	174.0	56.5	33	221.6	72.0	83	269.1	87.4
34	32.3	10.5	84	79.9	26.0	34	127.4	41.4	84	175.0	56.9	34	222.5	72.3	84	270.1	87.8
35	33.3	10.8	85	80.8	26.3	35	128.4	41.7	85	175.9	57.2	35	223.5	72.6	85	271.0	88.1
36	34.2	11.1	86	81.8	26.6	136	129.3	42.0	186	176.9	57.5	236	224.4	72.9	286	272.0	88.4
37	35.2	11.4	87	82.7	26.9	37	130.3	42.3	87	177.8	57.8	37	225.4	73.2	87	272.9	88.7
38	36.1	11.7	88	83.7	27.2	38	131.2	42.6	88	178.8	58.1	38	226.3	73.5	88	273.9	89.0
39	37.1	12.1	89	84.6	27.5	39	132.2	43.0	89	179.7	58.4	39	227.3	73.9	89	274.8	89.3
40	38.0	12.4	90	85.6	27.8	40	133.1	43.3	90	180.7	58.7	40	228.2	74.2	90	275.8	89.6
41	39.0	12.7	91	86.5	28.1	141	134.1	43.6	191	181.6	59.0	241	229.2	74.5	291	276.7	89.9
42	39.9	13.0	92	87.5	28.4	42	135.0	43.9	92	182.6	59.3	42	230.1	74.8	92	277.7	90.2
43	40.9	13.3	93	88.4	28.7	43	136.0	44.2	93	183.5	59.6	43	231.1	75.1	93	278.6	90.5
44	41.8	13.6	94	89.4	29.0	44	136.9	44.5	94	184.5	59.9	44	232.0	75.4	94	279.6	90.8
45	42.8	13.9	95	90.3	29.4	45	137.9	44.8	95	185.4	60.3	45	233.0	75.7	95	280.5	91.2
46	43.7	14.2	96	91.3	29.7	146	138.8	45.1	196	186.4	60.6	246	233.9	76.0	296	281.5	91.5
47	44.7	14.5	97	92.2	30.0	47	139.8	45.4	97	187.3	60.9	47	234.9	76.3	97	282.4	91.8
48	45.6	14.8	98	93.2	30.3	48	140.7	45.7	98	188.3	61.2	48	235.8	76.6	98	283.4	92.1
49	46.6	15.1	99	94.1	30.6	49	141.7	46.0	99	189.2	61.5	49	236.8	76.9	99	284.3	92.4
50	47.6	15.5	100	95.1	30.9	150	142.7	46.4	200	190.2	61.8	250	237.8	77.3	300	285.3	92.7
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	La

Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep
1	00.9	00.3	51	48.2	16.6	101	95.5	32.9	151	142.8	49.2	201	190.0	65.4	251	237.3	81.7
2	01.9	00.7	52	49.2	16.9	02	96.4	33.2	52	143.7	49.5	02	191.0	65.8	52	238.3	82.1
3	02.8	01.0	53	50.1	17.3	03	97.4	33.5	53	144.7	49.8	03	191.9	66.1	53	239.2	82.4
4	03.8	01.3	54	51.1	17.6	04	98.3	33.9	54	145.6	50.1	04	192.9	66.4	54	240.1	82.7
5	04.7	01.6	55	52.0	17.9	05	99.3	34.2	55	146.5	50.5	05	193.8	66.7	55	241.1	83.0
6	05.7	02.0	56	52.9	18.2	106	100.2	34.5	156	147.5	50.8	206	194.8	67.1	256	242.0	83.4
7	06.6	02.3	57	53.9	18.6	07	101.2	34.8	57	148 4	51.1	07	195.7	67.4	57	243.0	83.7
8	07.6	02.6	58	54.8	18.9	08	102.1	35.2	58	149.4	51.4	08	196.7	67.7	58	243.9	84.0
9	08.5	02.9	59	55.8	19.2	09	103.1	35.5	59	150.3	51.8	09	197.6	68.1	59	244.9	84.3
10	09.5	03.3	60	56.7	19.5	10	104.0	35.8	60	151.3	52.1	10	198.5	68.4	60	245.8	84.7
11	10.4	03.6	61	57.7	19.9	111	104.9	36.1	161	152.2	52.4	211	199.5	68.7	261	246.8	85.0
12	11.3	03.9	62	58.6	20.2	12	105.9	36.5	62	153.2	52.7	12	200.4	69.0	62	247.7	85.3
13	12.3	04.2	63	59.6	20.5	13	106.8	36.8	63	154.1	53.1	13	201.4	69.4	63	248.7	85.6
14	13.2	04.6	64	60.5	20.8	14	107.8	37.1	64	155.1	53.4	14	202.3	69.7	64	249.6	86.0
15	14.2	04.9	65	61.5	21.2	15	108.7	37.4	65	156.0	53.7	15	203.3	70.0	65	250.5	86.3
16	15.1	05.2	66	62.4	21.5	116	109.7	37.8	166	156.9	54.0	216	204.2	70.3	266	251.5	86.6
17	16.1	05.5	67	63.3	21.8	17	110.6	38.1	67	157.9	54.4	17	205.2	70.7	67	252.4	86.9
18	17.0	05.9	68	64.3	22.1	18	111.6	38.4	68	158.8	54.7	18	206.1	71.0	68	253.4	87.3
19	18.0	06.2	69	65.2	22.5	19	112.5	38.7	69	159.8	55.0	19	207.1	71.3	69	254.3	87.6
20	18.9	06.5	70	66.2	22.8	20	113.5	39.1	70	160.7	55.4	20	208.0	71.6	70	255.3	87.9
21	19.9	06.8	71	67.1	23.1	121	114.4	39.4	171	161.7	55.7	221	208.9	72.0	271	256.2	88.2
22	20.8	07.2	72	68.1	23.4	22	115.3	39.7	72	162.6	56.0	22	209.9	72.3	72	257.2	88.6
23	21.7	07.5	73	69.0	23.8	23	116.3	40.0	73	163.6	56.3	23	210.8	72.6	73	258.1	88.9
24	22.7	07.8	74	70.0	24.1	24	117.2	40.4	74	164.5	56.7	24	211.8	72.9	74	259.1	89.2
25	23.6	08.1	75	70.9	24.4	25	118.2	40.7	75	165.5	57.0	25	212.7	73.3	75	260.0	89.5
26	24.6	08.5	76	71.9	24.7	126	119.1	41.0	176	166.4	57.3	226	213.7	73.6	276	260.9	89.9
27	25.5	08.8	77	72.8	25.1	27	120.1	41.4	77	167.3	57.6	27	214.6	73.9	77	261.9	90.2
28	26.5	09.1	78	73.7	25.4	28	121.0	41.7	78	168.3	58.0	28	215.6	74.2	78	262.8	90.5
29	27.4	09.4	79	74.7	25.7	29	122.0	42.0	79	169.2	58.3	29	216.5	74.6	79	263.8	90.8
30	28.4	09.8	80	75.6	26.0	30	122.9	42.3	80	170.2	58.6	30	217.5	74.9	80	264.7	91.2
31	29.3	10.1	81	76.6	26.4	131	123.9	42.7	181	171.1	58.9	231	218.4	75.2	281	265.7	91.5
32	30.3	10.4	82	77.5	26.7	32	124.8	43.0	82	172.1	59.3	32	219.3	75.5	82	266.6	91.8
33	31.2	10.7	83	78.5	27.0	33	125.7	43.3	83	173.0	59.6	33	220.3	75.9	83	267.6	92.1
34	32.1	11.1	84	79.4	27.4	34	126.7	43.6	84	174.0	59.9	34	221.2	76.2	84	268.5	92.5
35	33.1	11.4	85	80.4	27.7	35	127.6	44.0	85	174.9	60.2	35	222.2	76.5	85	269.5	92.8
36	34.0	11.7	86	81.3	28.0	136	128.6	44.3	186	175.9	60.6	236	223.1	76.8	286	270.4	93.1
37	35.0	12.0	87	82.3	28.3	37	129.5	44.6	87	176.8	60.9	37	224.1	77.2	87	271.3	93.4
38	35.9	12.4	88	83.2	28.7	38	130.5	44.9	88	177.7	61.2	38	225.0	77.5	88	272.3	93.8
39	36.9	12.7	89	84.1	29.0	39	131.4	45.3	89	178.7	61.5	39	226.0	77.8	89	273.2	94.1
40	37.8	13.0	90	85.1	29.3	40	132.4	45.6	90	179.6	61.9	40	226.9	78.1	90	274.2	94.4
41	38.8	13.3	91	86.0	29.6	141	133.3	45.9	191	180.6	62.2	241	227.9	78.5	291	275.1	94.7
42	39.7	13.7	92	87.0	30.0	42	134.3	46.2	92	181.5	62.5	42	228.8	78.8	92	276.1	95.1
43	40.7	14.0	93	87.9	30.3	43	135.2	46.6	93	182.5	62.8	43	229.7	79.1	93	277.0	95.4
44	41.6	14.3	94	88.9	30.6	44	136.1	46.9	94	183.4	63.2	44	230.7	79.4	94	278.0	95.7
45	42.6	14.7	95	89.8	30.9	45	137.1	47.2	95	184.4	63.5	45	231.6	79.8	95	278.9	96.1
46	43.5	15.0	96	90.8	31.3	146	138.0	47.5	196	185.3	63.8	246	232.6	80.1	296	279.9	96.4
47	44.4	15.3	97	91.7	31.6	47	139.0	47.9	97	186.3	64.1	47	233.5	80.4	97	280.8	96.7
48	45.4	15.6	98	92.7	31.9	48	139.9	48.2	98	187.2	64.5	48	234.5	80.7	98	281.7	97.0
49	46.3	16.0	99	93.6	32.2	49	140.9	48.5	99	188.1	64.8	49	235.4	81.1	99	282.7	97.4
50	47.3	16.3	100	94.5	32.6	150	141.8	48.8	200	189.1	65.1	250	236.4	81.4	300	283.6	97.7
Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.9	00.3	51	47.9	17.4	101	94.9	34.5	151	141.9	51.6	201	188.9	68.7	251	235.9	85.8
2	01.9	00.7	52	48.9	17.8	02	95.8	34.9	52	142.8	52.0	02	189.8	69.1	52	236.8	86.2
3	02.8	01.0	53	49.8	18.1	03	96.8	35.2	53	143.8	52.3	03	190.8	69.4	53	237.7	86.5
4	03.8	01.4	54	50.7	18.5	04	97.7	35.6	54	144.7	52.7	04	191.7	69.8	54	238.7	86.9
5	04.7	01.7	55	51.7	18.8	05	98.7	35.9	55	145.7	53.0	05	192.6	70.1	55	239 6	87.2
6	05.6	02.1	56	52.6	19.2	106	99.6	36.3	156	146.6	53 4	206	193.6	70.0	256	240 6	87.6
7	06.6	02.4	57	53.6	19.5	07	100.5	36.6	57	147.5	53.7	07	194.5	70.8	57	241.5	87.9
8	07.5	02.7	58	54.5	19.8	08	101.5	36.9	58	148.5	54.0	08	195.5	71.1	58	242.4	88.2
9	08.5	03.1	59	55.4	20.2	09	102.4	37.3	59	149.4	54.4	09	196.4	71.5	59	243.4	88.6
10	09.4	03.4	60	56.4	20.5	10	103.4	37.6	60	150.4	54.7	10	197.3	71.8	60	244.3	88.9
11	10.3	03.8	61	57.3	20.9	111	104.3	38.0	161	151.3	55.1	211	198.3	72.2	261	245.3	89.3
12	11.3	04.1	62	58.3	21.2	12	105.2	38.3	62	152.2	55.4	12	199.2	72.5	62	246.2	89.6
13	12.2	04.4	63	59.2	21.5	13	106.2	38.6	63	153.2	55.7	13	200.2	72.8	63	247.1	89.9
14	13.2	04.8	64	60.1	21.9	14	107.1	39.0	64	154.1	56.1	14	201.1	73.2	64	248.1	90.3
15	14.1	05.1	65	61.1	22.2	15	108.1	39.3	65	155.1	56.4	15	202.0	73.5	65	249.0	90.6
16	15.0	05.5	66	62.0	22.6	116	109.0	39.7	166	156.0	56.8	216	203.0	73.9	266	250.0	91.0
17	16.0	05.8	67	63.0	22.9	17	109.9	40.0	67	156.9	57.1	17	203.9	74.2	67	250.9	91.3
18	16.9	06.2	68	63.9	23.3	18	110.9	40.4	68	157.9	57.5	18	204.9	74.6	68	251.8	91.7
19	17.9	06.5	69	64.8	23.6	19	111.8	40.7	69	158.8	57.8	19	205.8	74.9	69	252.8	92.0
20	18.8	06.8	70	65.8	23.9	20	112.8	41.0	70	159.7	58.1	20	206.7	75.2	70	253.7	92.3
21	19.7	07.2	71	66.7	24.3	121	113.7	41.4	171	160.7	58.5	221	207.7	75.6	271	254.7	92.7
22	20.7	07.5	72	67.7	24.6	22	114.6	41.7	72	161.6	58.8	22	208.6	75.9	72	255.6	93.0
23	21.6	07.9	73	68.6	25.0	23	115.6	42.1	73	162.6	59.2	23	209.6	76.3	73	256.5	93.4
24	22.6	08.2	74	69.5	25.3	24	116.5	42.4	74	163.5	59.5	24	210.5	76.6	74	257.5	93.7
25	23.5	08.6	75	70.5	25.7	25	117.5	42.8	75	164.4	59.9	25	211.4	77.0	75	258.4	94.1
26	24.4	08.9	76	71.4	26.0	126	118.4	43.1	176	165.4	60.2	226	212.4	77.3	276	259.4	94.4
27	25.4	09.2	77	72.4	26.3	27	119.3	43.4	77	166.3	60.5	27	213.3	77.6	77	260.3	94.7
28	26.3	09.6	78	73.3	26.7	28	120.3	43.8	78	167.3	60.9	28	214.3	78.0	78	261.2	95.1
29	27.3	09.9	79	74.2	27.0	29	121.2	44.1	79	168.2	61.2	29	215.2	78.3	79	262.2	95.4
30	28.2	10.3	80	75.2	27.4	30	122.2	44.5	80	169.1	61.6	30	216.1	78.7	80	263.1	95.8
31	29.1	10.6	81	76.1	27.7	131	123.1	44.8	181	170.1	61.9	231	217.1	79.0	281	264.1	96.1
32	30.1	10.9	82	77.1	28.0	32	124.0	45.1	82	171.0	62.2	32	218.0	79.3	82	265.0	96.4
33	31.0	11.3	83	78.0	28.4	33	125.0	45.5	83	172.0	62.6	33	219.0	79.7	83	265.9	96.8
34	31.9	11.6	84	78.9	28.7	34	125.9	45.8	84	172.9	62.9	34	219.9	80.0	84	266.9	97.1
35	32.9	12.0	85	79.9	29.1	35	126.9	46.2	85	173.8	63.3	35	220.8	80.4	85	267.8	97.5
36	33.8	12.3	86	80.8	29.4	136	127.8	46.5	186	174.8	63.6	236	221.8	80.7	286	268.8	97.8
37	34.8	12.7	87	81.8	29.8	37	128.7	46.9	87	175.7	64.0	37	222.7	81.1	87	269.7	98.2
38	35.7	13.0	88	82.7	30.1	38	129.7	47.2	88	176.7	64.3	38	223.6	81.4	88	270.6	98.5
39	36.6	13.3	89	83.6	30.4	39	130.6	47.5	89	177.6	64.6	39	224.6	81.7	89	271.6	98.8
40	37.6	13.7	90	84.6	30.8	40	131.6	47.9	90	178.5	65.0	40	225.5	82.1	90	272.5	99.2
41	38.5	14.0	91	85.5	31.1	141	132.5	48.2	191	179.5	65.3	241	226.5	82.4	291	273.5	99.5
42	39.5	14.4	92	86.5	31.5	42	133.4	48.6	92	180.4	65.7	42	227.4	82.8	92	274.4	99.9
43	40.4	14.7	93	87.4	31.8	43	134.4	48.9	93	181.4	66.0	43	228.3	83.1	93	275.3	100.2
44	41.3	15.0	94	88.3	32.1	44	135.3	49.2	94	182.3	66.3	44	229.3	83.4	94	276.3	100.5
45	42.3	15.4	95	89.3	32.5	45	136.3	49.6	95	183.2	66.7	45	230.2	83.8	95	277.2	100.9
46	43.2	15.7	96	90.2	32.8	146	137.2	49.9	196	184.2	67.0	246	231.2	84.1	296	278.2	101.1
47	44.2	16.1	97	91.2	33.2	47	138.1	50.3	97	185.1	67.4	47	232.1	84.5	97	279.1	101.6
48	45.1	16.4	98	92.1	33.5	48	139.1	50.6	98	186.1	67.7	48	233.0	84.8	98	280.0	101.9
49	46.0	16.8	99	93.0	53.9	49	140.0	51.0	99	187.0	68.1	49	234.0	85.2	99	281.0	102.3
50	47.0	17.1	100	94.0	34.2	150	141.0	51.3	200	187.9	68.4	250	234.9	85.5	300	281.9	102.6
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.9	00.4	51	47.6	18.3	101	94.3	36.2	151	141.0	54.1	201	187.6	72.0	251	234.3	90.0
2	01.9	00.7	52	48.5	18.5	02	95.3	36.6	52	141.9	54.5	02	188.6	72.4	52	235.3	90.3
3	02.8	01.1	53	49.5	19.0	03	96.2	36.9	53	142.9	54.8	03	189.5	72.8	53	236.2	90.7
4	03.7	01.4	54	50.4	19.4	04	97.1	37.3	54	143.8	55.2	04	190.4	73.1	54	237.1	91.0
5	04.7	01.8	55	51.3	19.7	05	98.1	37.6	55	144.7	55.6	05	191.4	73.5	55	238.1	91.4
6	05.6	02.2	56	52.3	20.1	106	99.0	38.0	156	145.7	55.9	206	192.3	73.8	256	239.0	91.8
7	06.5	02.5	57	53.2	20.4	07	99.9	38.3	57	146.6	56.3	07	193.2	74.2	57	239.9	92.1
8	07.5	02.9	58	54.1	20.8	08	100.9	38.7	58	147.5	56.6	08	194.2	74.5	58	240.9	92.5
9	08.4	03.2	59	55.1	21.1	09	101.8	39.1	59	148.5	57.0	09	195.1	74.9	59	241.8	92.8
10	09.3	03.6	60	56.0	21.5	10	102.7	39.4	60	149.4	57.3	10	196.0	75.3	60	242.7	93.2
11	10.3	03.9	61	56.9	21.9	111	103.7	39.8	161	150.3	57.7	211	197.0	75.6	261	243.7	93.5
12	11.2	04.3	62	57.9	22.2	12	104.6	40.1	62	151.3	58.1	12	197.9	76.0	62	244.6	93.9
13	12.1	04.7	63	58.8	22.6	13	105.5	40.5	63	152.2	58.4	13	198.8	76.3	63	245.5	94.3
14	13.1	05.0	64	59.7	22.9	14	106.5	40.9	64	153.1	58.8	14	199.8	76.7	64	246.5	94.6
15	14.0	05.4	65	60.7	23.3	15	107.4	41.2	65	154.1	59.1	15	200.7	77.1	65	247.4	95.0
16	14.9	05.7	66	61.6	23.7	116	108.3	41.6	166	155.0	59.5	216	201.6	77.4	266	248.3	95.3
17	15.9	06.1	67	62.5	24.0	17	109.3	41.9	67	155.9	59.9	17	202.6	77.8	67	249.3	95.7
18	16.8	06.5	68	63.5	24.4	18	110.2	42.3	68	156.9	60.2	18	203.5	78.1	68	250.2	96.1
19	17.7	06.8	69	64.4	24.7	19	111.1	42.6	69	157.8	60.6	19	204.4	78.5	69	251.1	96.4
20	18.7	07.2	70	65.3	25.1	20	112.1	43.0	70	158.7	60.9	20	205.4	78.8	70	252.1	96.8
21	19.6	07.5	71	66.3	25.4	121	113.0	43.4	171	159.7	61.3	221	206.3	79.2	271	253.0	97.1
22	20.5	07.9	72	67.2	25.8	22	113.9	43.7	72	160.6	61.6	22	207.2	79.6	72	253.9	97.5
23	21.5	08.2	73	68.1	26.2	23	114.9	44.1	73	161.5	62.0	23	208.2	79.9	73	254.9	97.8
24	22.4	08.6	74	69.1	26.5	24	115.8	44.4	74	162.5	62.4	24	209.1	80.3	74	255.8	98.2
25	23.3	09.0	75	70.0	26.9	25	116.7	44.8	75	163.4	62.7	25	210.0	80.6	75	256.7	98.6
26	24.3	09.3	76	70.9	27.2	126	117.7	45.2	176	164.3	63.1	226	111.0	81.0	276	257.7	98 9
27	25.2	09.7	77	71.9	27.6	27	118.6	45.5	77	165.3	63.4	27	111.9	81.4	77	258.6	99.3
28	26.1	10.0	78	72.8	28.0	28	119.5	45.9	78	166.2	63.8	28	212.8	81.7	78	259.5	99.6
29	27.1	10.4	79	73.7	28.3	29	120.5	46.2	79	167.1	64.2	29	213.8	82.1	79	260.5	100.0
30	28.0	10.8	80	74.7	28.7	30	121.4	46.6	80	168.1	64.5	30	214.7	82.4	80	261.4	100.4
31	28.9	11.1	81	75.6	29.0	131	122.3	47.0	181	169.0	64.9	231	215.6	82.8	281	262.3	100.7
32	29.9	11.5	82	76.5	29.4	32	123.3	47.3	82	169.9	65.2	32	216.6	83.1	82	263.3	101.1
33	30.8	11.8	83	77.5	29.7	33	124.2	47.7	83	170.9	65.6	33	217.5	83.5	83	264.2	101.4
34	31.7	12.2	84	78.4	30.1	34	125.1	48.0	84	171.8	65.9	34	218.4	83.9	84	265.1	101.8
35	32.7	12.5	85	79.3	30.5	35	126.1	48.4	85	172.7	66.3	35	219.4	84.2	85	266.1	102.1
36	33.6	12.9	86	80.3	30.8	136	127.0	48.7	186	173.7	66.7	236	220.3	84.6	286	267.0	102.5
37	34.5	13.3	87	81.2	31.2	37	127.9	49.1	87	174.6	67.0	37	221.2	84.9	87	267.9	102.9
38	35.5	13.6	88	82.1	31.5	38	128.9	49.5	88	175.5	67.4	38	222.2	85.3	88	268.9	103.2
39	36.4	14.0	89	83.1	31.9	39	129.8	49.8	89	176.5	67.7	39	223.1	85.7	89	269.8	103.6
40	37.3	14.3	90	84.0	32.3	40	130.7	50.2	90	177.4	68.1	40	224.1	86.0	90	270.7	103.9
41	38.3	14.7	91	84.9	32.6	141	131.7	50.5	191	178.3	68.5	241	225.0	86.4	291	271.7	104.3
42	39.2	15.1	92	85.9	33.0	42	132.6	50.9	92	179.3	68.8	42	225.9	86.7	92	272.6	104.7
43	40.1	15.4	93	86.8	33.3	43	133.5	51.3	93	180.2	69.2	43	226.9	87.1	93	273.5	105.0
44	41.1	15.8	94	87.7	33.7	44	134.5	51.6	94	181.1	69.5	44	227.8	87.4	94	274.5	105.4
45	42.0	16.1	95	88.7	34.0	45	135.4	52.0	95	182.1	69.9	45	228.7	87.8	95	275.4	105.7
46	42.9	16.5	96	89.6	34.4	146	136.3	52.3	196	183.0	70.2	246	229.7	88.2	296	276.3	106.1
47	43.9	16.8	97	90.5	34.8	47	137.3	52.7	97	183.9	70.6	47	230.6	88.5	97	277.3	106.4
48	44.8	17.2	98	91.5	35.1	48	138.2	53.0	98	184.9	71.0	48	231.5	88.9	98	278.2	106.8
49	45.7	17.6	99	92.4	35.5	49	139.1	53 4	99	185.8	71.3	49	232.5	89.2	99	279.1	107.2
50	46.7	17.9	100	93.4	35.8	150	140.1	53.8	200	186.7	71.7	250	233.4	89.6	300	280.1	107.5
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.9	00.4	51	47.3	19.1	101	93.6	37.8	151	140.0	56.6	201	186.4	75.3	251	232.7	94.0
2	01.9	00.7	52	48.2	19.5	02	94.6	38.2	52	140.9	56.9	02	187.3	75.7	52	233.7	94.4
3	02.8	01.1	53	49.1	19.9	03	95.5	38.6	53	141.9	57.3	03	188.2	76.0	53	234.6	94.8
4	03.7	01.5	54	50.1	20.2	04	96.4	39.0	54	142.8	57.7	04	189.1	76.4	54	235.5	95.2
5	04.6	01.9	55	51.0	20.6	05	97.4	39.3	55	143.7	58.1	05	190.1	76.8	55	236.4	95.5
6	05.6	02.2	56	51.9	21.0	106	98.3	39.7	156	144.6	58.4	206	191.0	77.2	256	237.4	95.9
7	06.5	02.6	57	52.9	21.4	07	99.2	40.1	57	145.6	58.8	07	191.9	77.5	57	238.3	96.3
8	07.4	03.0	58	53.8	21.7	08	100.1	40.5	58	146.5	59.2	08	192.9	77.9	58	239.2	96.6
9	08.3	03.4	59	54.7	22.1	09	101.1	40.8	59	147.4	59.6	09	193.8	78.3	59	240.1	97.0
10	09.3	03.7	60	55.6	22.5	10	102.0	41.2	60	148.4	59.9	10	194.7	78.7	60	241.1	97.4
11	10.2	04.1	61	56.6	22.9	111	102.9	41.6	161	149.3	60.3	211	195.6	79.0	261	242.0	97.8
12	11.1	04.5	62	57.5	23.2	12	103.8	42.0	62	150.2	60.7	12	196.6	79.4	62	242.9	98.1
13	12.1	04.9	63	58.4	23.6	13	104.8	42.3	63	151.1	61.1	13	197.5	79.8	63	243.9	98.5
14	13.0	05.2	64	59.3	24.0	14	105.7	42.7	64	152.1	61.4	14	198.4	80.2	64	244.8	98 9
15	13.9	05.6	65	60.3	24.3	15	106.6	43.1	65	153.0	61.8	15	199.3	80.5	65	245.7	99.3
16	14.8	06.0	66	61.2	24.7	116	107.6	43.5	166	153.9	62.2	216	200.3	80.9	266	246.6	99.6
17	15.8	06.4	67	62.1	25.1	17	108.5	43.8	67	154.8	62.6	17	201.2	81.3	67	247.6	100.0
18	16.7	06.7	68	63.0	25.5	18	109.4	44.2	68	155.8	62.9	18	202.1	81.7	68	248.5	100.4
19	17.6	07.1	69	64.0	25.8	19	110.3	44.6	69	156.7	63.3	19	203.1	82.0	69	249.4	100.8
20	18.5	07.5	70	64.9	26.2	20	111.3	45.0	70	157.6	63.7	20	204.0	82.4	70	250.3	101.1
21	19.5	07.9	71	65.8	26.6	121	112.2	45.3	171	158.6	64.1	221	204.9	82.8	271	251.3	101.5
22	20.4	08.2	72	66.8	27.0	22	113.1	45.7	72	159.5	64.4	22	205.8	83.2	72	252.2	101.9
23	21.3	08.6	73	67.7	27.3	23	114.0	46.1	73	160.4	64.8	23	206.7	83.5	73	253.1	102.3
24	22.3	09.0	74	68.6	27.7	24	115.0	46.5	74	161.3	65.2	24	207.7	83.9	74	254.1	102.6
25	23.2	09.4	75	69.5	28.1	25	115.9	46.8	75	162.3	65.6	25	208.6	84.3	75	255.0	103.0
26	24.1	09.7	76	70.5	28.5	126	116.8	47.2	176	163.2	65.9	226	209.5	84.7	276	255.9	103.4
27	25.0	10.1	77	71.4	28.8	27	117.8	47.6	77	164.1	66.3	27	210.5	85.0	77	256.8	103.8
28	26.0	10.5	78	72.3	29.2	28	118.7	47.9	78	165.0	66.7	28	111.4	85.4	78	257.8	104.1
29	26.9	10.9	79	73.2	29.6	29	119.6	48.3	79	166.0	67.1	29	212.5	85.8	79	258.7	104.5
30	27.8	11.2	80	74.2	30.0	30	120.5	48.7	80	166.9	67.4	30	213.3	86.2	80	259.6	104.9
31	28.7	11.6	81	75.1	30.3	131	121.5	49.1	181	167.8	67.8	231	214.2	86.5	281	260.5	105.3
32	29.7	12.0	82	76.0	30.7	32	122.4	49.4	82	168.8	68.2	32	215.1	86.9	82	261.5	105.6
33	30.6	12.4	83	77.0	31.1	33	123.3	49.8	83	169.7	68.6	33	216.0	87.3	83	262.4	106.0
34	31.5	12.7	84	77.9	31.5	34	124.2	50.2	84	170.6	68.0	34	217.0	87.7	84	263.3	106.4
35	32.5	13.1	85	78.8	31.8	35	125.2	50.6	85	171.5	69.3	35	217.9	88.0	85	264.3	106.8
36	33.4	13.5	86	79.7	32.2	136	126.1	50.9	186	172.5	69.7	236	218.8	88.4	286	265.2	107.1
37	34.3	13.9	87	80.7	32.6	37	127.0	51.3	87	173.4	70.1	37	219.7	88.8	87	266.1	107.5
38	35.2	14.2	88	81.6	33.0	38	128.0	51.7	88	174.3	70.4	38	220.7	89.2	88	267.0	107.9
39	36.2	14.6	89	82.5	33.3	39	128.9	52.1	89	175.2	70.8	39	221.6	89.5	89	268.0	108.3
40	37.1	15.0	90	83.4	33.7	40	129.8	52.4	90	176.2	71.2	40	222.5	89.9	90	268.9	108.6
41	38.0	15.4	91	84.4	34.1	141	130.7	52.8	191	177.1	71.5	241	223.5	90.3	291	269.8	109 0
42	38.9	15.7	92	85.3	34.5	42	131.7	53.2	92	178.0	71.9	42	224.4	90.7	92	270.7	109.4
43	39.9	16.1	93	86.2	34.8	43	132.6	53 6	93	178.9	72.3	43	225.3	91.0	93	271.7	109.8
44	40.8	16.5	94	87.2	35.2	44	133.5	53.9	94	179.8	72.7	44	226.2	91.4	94	272.6	110.1
45	41.7	16.9	95	88.1	35.6	45	134.4	54.3	95	180.8	73.0	45	227.2	91.8	95	273.5	110.5
46	42.7	17.2	96	89.0	36.0	146	135.4	54.7	196	181.7	73.4	246	228.1	92.2	296	274.5	110.9
47	43.6	17.6	97	89.9	36.3	47	136.3	55.1	97	182.7	73.8	47	229.0	92.5	97	275.4	111.3
48	44.5	18.0	98	90.9	36.7	48	137.2	55.4	98	183.6	74.2	48	229.9	92.9	98	276.3	111.6
49	45.4	18.4	99	91.8	37.1	49	138 2	55.8	99	184.5	74.5	49	230.9	93.3	99	277.2	112.0
50	46.4	18.7	100	92.7	37.5	150	139.1	56.2	200	185.4	74.9	250	231.8	93.7	300	278.2	112.4
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.9	00.4	51	46.9	19.9	101	93.0	39.5	151	139.0	59.0	201	185.0	78.5	251	231.0	98.1
2	01.8	00.8	52	47.9	20.3	02	93.9	39.9	52	139.9	59.4	02	185.9	78.9	52	232.0	98.5
3	02.8	01.2	53	48.8	20.7	03	94.8	40.2	53	140.8	59.8	03	186.9	79.3	53	232.9	98.8
4	03.7	01.6	54	49.7	21.1	04	95.7	40.6	54	141.8	60.2	04	187.8	79.7	54	233.8	99.2
5	04.6	02.0	55	50.6	21.5	05	96.7	41.0	55	142.7	60.6	05	188.7	80.1	55	234.7	99.6
6	05.5	02.3	56	51.5	21.9	106	97.6	41.4	156	143.6	60.9	206	189.6	80.5	256	235.6	100.0
7	06.4	02.7	57	52.5	22.3	07	98.5	41.8	57	144.5	61.3	07	190.5	80.9	57	236.6	100.4
8	07.4	03.1	58	53.4	22.7	08	99.4	42.2	58	145.4	61.7	08	191.5	81.3	58	237.5	100.8
9	08.3	03.5	59	54.3	23.1	09	100.3	42.6	59	146.4	62.1	09	192.4	81.7	59	238.4	101.2
10	09.2	03.9	60	55.2	23.4	10	101.3	43.0	60	147.3	62.5	10	193.3	82.0	60	239.3	101.6
11	10.1	04.3	61	56.1	23.8	111	102.2	43.4	161	148.2	62.9	211	194.2	82.4	261	240.2	102.0
12	11.0	04.7	62	57.1	24.2	12	103.1	43.8	62	149.1	63.3	12	195.1	82.8	62	241.2	102.4
13	12.0	05.1	63	58.0	24.6	13	104.0	44.1	63	150.0	63.7	13	196.1	83.2	63	242.1	102.8
14	12.9	05.5	64	58.9	25.0	14	104.9	44.5	64	151.0	64.1	14	197.0	83.6	64	243.0	103.1
15	13.8	05.9	65	59.8	25.4	15	105.9	44.9	65	151.9	64.5	15	197.9	84.0	65	243.9	103.5
16	14.7	06.3	66	60.8	25.8	116	106.8	45.3	166	152.8	64.9	216	198.8	84.4	266	244.9	103.9
17	15.6	06.6	67	61.7	26.2	17	107.7	45.7	67	153.7	65.2	17	199.7	84.8	67	245.8	104.3
18	16.6	07.0	68	62.6	26.6	18	108.6	46.1	68	154.6	65.6	18	200.7	85.2	68	246.7	104.7
19	17.5	07.4	69	63.5	27.0	19	109.5	46.5	69	155.6	66.0	19	201.6	85.6	69	247.6	105.1
20	18.4	07.8	70	64.4	27.3	20	110.5	46.9	70	156.5	66.4	20	202.5	86.0	70	248.5	105.5
21	19.3	08.2	71	65.4	27.7	121	111.4	47.3	171	157.4	66.8	221	203.4	86.3	271	249.5	105.9
22	20.3	08.6	72	66.3	28.1	22	112.3	47.7	72	158.3	67.2	22	204.4	86.7	72	250.4	106.3
23	21.2	09.0	73	67.2	28.5	23	113.2	48.1	73	159.2	67.6	23	205.3	87.1	73	251.3	106.7
24	22.1	09.4	74	68.1	28.9	24	114.1	48.4	74	160.2	68.0	24	206.2	87.5	74	252.2	107.1
25	23.0	09.8	75	69.0	29.3	25	115.1	48.8	75	161.1	68.4	25	207.1	87.9	75	253.1	107.4
26	23.9	10.2	76	70.0	29.7	126	116.0	49.2	176	162.0	68.8	226	208.0	88.3	276	254.1	107.8
27	24.9	10.5	77	70.9	30.1	27	116.9	49.6	77	162.9	69.2	27	209.0	88.7	77	255.0	108.2
28	25.8	10.9	78	71.8	30.5	28	117.8	50.0	78	163.8	69.5	28	209.9	89.1	78	255.9	108.6
29	26.7	11.3	79	72.7	30.9	29	118.7	50.4	79	164.8	69.9	29	210.8	89.5	79	256.8	109.0
30	27.6	11.7	80	73.6	31.3	30	119.7	50.8	80	165.7	70.3	30	211.7	89.9	80	257.7	109.4
31	28.5	12.1	81	74.6	31.6	131	120.6	51.2	181	166.6	70.7	231	212.6	90.3	281	258.7	109.8
32	29.5	12.5	82	75.5	32.0	32	121.5	51.6	82	167.5	71.1	32	213.6	90.6	82	259.6	110.2
33	30.4	12,9	83	76.4	32.4	33	122.4	52.0	83	168.5	71.5	33	214.5	91.0	83	260.5	110.6
34	31.3	13.3	84	77.3	32.8	34	123.3	52.4	84	169.4	71.9	34	215.4	91.4	84	261.4	111.0
35	32.2	13.7	85	78.2	33.2	35	124.3	52.7	85	170.3	72.3	35	216.3	91.8	85	262.3	111.3
36	33.1	14.1	86	79.2	33.6	136	125.2	53.1	186	171.2	72.7	236	217.2	92.2	286	263.3	111.7
37	34.1	14.5	87	80.1	34.0	37	126.1	53.5	87	172.1	73.1	37	218.2	92.6	87	264.2	112.1
38	35.0	14.8	88	81.0	34.4	38	127.0	53.9	88	173.1	73.5	38	219.1	93.0	88	265.1	112.5
39	35.9	15.2	89	81.9	34.8	39	127.9	54.3	89	174.0	73.8	39	220.0	93.4	89	266.0	112.9
40	36.8	15.6	90	82.8	35.2	40	128.9	54.7	90	174.9	74.2	40	220.9	93.8	90	266.9	113.3
41	37.7	16.0	91	83.8	35.6	141	129.8	55.1	191	175.8	74.6	241	221.8	94.2	291	267.9	113.7
42	38.7	16.4	92	84.7	35.9	42	130.7	55.5	92	176.7	75.0	42	222.8	94.5	92	268.8	114.1
43	39.6	16.8	93	85.6	36.3	43	131.6	55.9	93	177.7	75.4	43	223.7	94.9	93	269.7	114.5
44	40.5	17.2	94	86.5	36.7	44	132.6	56.3	94	178.6	75.8	44	224.6	95.3	94	270.6	114.9
45	41.4	17.6	95	87.4	37.1	45	133.5	56.7	95	179.5	76.2	45	225.5	95.7	95	271.5	115.3
46	42.3	18.0	96	88.4	37.5	146	134.4	57.0	196	180.4	76.6	246	226.4	96.1	296	272.5	115.6
47	43.3	18.4	97	89.3	37.9	47	135.3	57.4	97	181.3	77.0	47	227.4	96.5	97	273.4	116.0
48	44.2	18.8	98	90.2	38.3	48	136.2	57.8	98	182.3	77.4	48	228.3	96.9	98	274.3	116.4
49	45.1	19.1	99	91.1	38.7	49	137.2	58.2	99	183.2	77.7	49	229.2	97.3	99	275.2	116.8
50	46.0	19.5	100	92.0	39.1	150	138.1	58.6	200	184.1	78.1	250	230.1	97.7	300	276.2	117.2
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.9	00.4	51	46.6	20.7	101	92.3	41.1	151	137.9	61.4	201	183.6	81.7	251	229.3	102.1
2	01.8	00.8	52	47.5	21.1	02	93.2	41.5	52	138.9	61.8	02	184.5	82.2	52	230.2	102.5
3	02.7	01.2	53	48.4	21.6	03	94.1	41.4	53	139.8	62.2	03	185.4	82.6	53	231.1	102.9
4	03.7	01.6	54	49.3	22.0	04	95.0	42.9	54	140.7	62.6	04	186.4	83.0	54	232.0	103.3
5	04.6	02.0	55	50.2	22.4	05	95.9	42.7	55	141.6	63.0	05	187.3	83.4	55	232.9	103.7
6	05.5	02.4	56	51.2	22.8	106	96.8	43.1	156	142.5	63.4	206	188.2	83.8	256	233.9	104.1
7	06.4	02.8	57	52.1	23.2	07	97.7	43.5	57	143.4	63.9	07	189.1	84.2	57	234.8	104.5
8	07.3	03.3	58	53.0	23.6	08	98.7	43.9	58	144.3	64.3	08	190.0	84.6	58	235.7	104.9
9	08.2	03.7	59	53.9	24.0	09	99.6	44.3	59	145.2	64.7	09	190.9	85.0	59	236.6	105.3
10	09.1	04.1	60	54.8	24.4	10	100.5	44.7	60	146.2	65.1	10	191.8	85.4	60	237.5	105.7
11	10.0	04.5	61	55.7	24.8	111	101.4	45.1	161	147.1	65.5	211	192.7	85.8	261	238.4	106.1
12	11.0	04.9	62	56.6	25.2	12	102.3	45.6	62	148.0	65.9	12	193.7	86.2	62	239.3	106.6
13	11.9	05.3	63	57.6	25.6	13	103.2	46.0	63	148.9	66.3	13	194.6	86.6	63	240.3	107.0
14	12.8	05.7	64	58.5	26.0	14	104.1	46.4	64	149.8	66.7	14	195.5	87.0	64	241.2	107.4
15	13.7	06.1	65	59.4	26.4	15	105.1	46.8	65	150.7	67.1	15	196.4	87.4	65	242.1	108.8
16	14.6	06.5	66	60.3	26.8	116	106.0	47.2	166	151.6	67.5	216	197.3	87.8	266	243.0	107.2
17	15.5	06.9	67	61.2	27.2	17	106.9	47.6	67	152.6	67.9	17	198.2	88 3	67	243.9	108.6
18	16.4	07.3	68	62.1	27.7	18	107.8	48.0	68	153.5	68.3	18	199.1	88.7	68	244.8	109.0
19	17.4	07.7	69	63.0	28.1	19	108.7	48.4	69	154.4	68.7	19	200.1	89.1	69	245.7	109.4
20	18.3	08.1	70	63.9	28.5	20	109.6	48.8	70	155.3	69.1	20	201.0	89.5	70	246.6	109.8
21	19.2	08.5	71	64.9	28.9	121	110.5	49.2	171	156.2	69.5	221	201.9	89.9	271	247.6	110.2
22	20.1	08.9	72	65.8	29.3	22	111.4	49.6	72	157.1	70.0	22	202.8	90.3	72	248.5	110.6
23	21.0	09.4	73	66.7	29.7	23	112.4	50.0	73	158.0	70.4	23	203.7	90.7	73	249.4	111.0
24	21.9	09.8	74	67.6	30.1	24	113.3	50.4	74	158.9	70.8	24	204.6	91.1	74	250.3	111.4
25	22.8	10.2	75	68.5	30.5	25	114.2	50.8	75	159.9	71.2	25	205.5	91.5	75	251.2	111.8
26	23.8	10.6	76	69.4	30.9	126	115.1	51.2	176	160.8	71.6	226	206.5	91.9	276	252.1	112.2
27	24.7	11.0	77	70.3	31.3	27	116.0	51.7	77	161.7	72.0	27	207.4	92.3	77	253.0	112.7
28	25.6	11.4	78	71.3	31.7	28	116.9	52.1	78	162.6	72.4	28	208.3	92.7	78	254.0	113.1
29	26.5	11.8	79	72.2	32.1	29	117.8	52.5	79	163.5	72.8	29	209.2	93.1	79	254.9	113.5
30	27.4	12.2	80	73.1	32.5	30	118.8	52.9	80	164.4	73.2	30	210.1	93.5	80	255.8	113.9
31	28.3	12,6	81	74.0	32.9	131	119.7	53.3	181	165.3	73.6	231	211.0	93.9	281	256.7	114.3
32	29.2	13.0	82	74.9	33.3	32	120.6	53.7	82	166.3	74.0	32	211.9	94.4	82	257.6	114.7
33	30.1	13.4	83	75.8	33.8	33	121.5	54.1	83	167.2	74.4	33	212.8	94.8	83	258.5	115.1
34	31.1	13.8	84	76.7	34.2	34	122.4	54.5	84	168.1	74.8	34	213.8	95.2	84	259.4	115.5
35	32.0	14.2	85	77.6	34.6	35	123.3	54.9	85	169.0	75.2	35	214.7	95.6	85	260.3	115.9
36	32.9	14.6	86	78.6	35.0	136	124.2	55.3	186	169.9	75.6	236	215.6	96.0	286	261.3	116.3
37	33.8	15.0	87	79.5	35.4	37	125.1	55.7	87	170.8	76.1	37	216.5	96.4	87	262.2	116.7
38	34.7	15.5	88	80.4	35.8	38	126.1	56.1	88	171.7	76.5	38	217.4	96.8	88	263.1	117.1
39	35.6	15.9	89	81.3	36.2	39	127.0	56.5	89	172.7	76.9	39	218.3	97.2	89	264.0	117.5
40	36.5	16.3	90	82.2	36.6	40	127.9	56.9	90	173.6	77.3	40	219.2	97.6	90	264.9	117.9
41	37.5	16.7	91	83.1	37.0	141	128.8	57.3	191	174.5	77.7	241	220.2	98.0	291	265.8	118.3
42	38.4	17.1	92	84.0	37.4	42	129.7	57.8	92	175.4	78.1	42	221.1	98.4	92	266.7	118.8
43	39.3	17.5	93	85.0	37.8	43	130.6	58.2	93	176.3	78.5	43	222.0	98.8	93	267.7	119.2
44	40.2	17.9	94	85.9	38.2	44	131.5	58.6	94	177.2	78.9	44	222.9	99.2	94	268.6	119.6
45	41.1	18.3	95	86.8	38.6	45	132.5	59.0	95	178.1	79.3	45	223.8	99.6	95	269.5	120.0
46	42.0	18.7	96	87.7	39.0	146	133.4	59.4	196	179.0	79.7	246	224.7	100.0	296	270.4	120.4
47	42.9	19.1	97	88.6	39.4	47	134.3	59.8	97	180.0	80.1	47	225.6	100.5	97	271.3	120.8
48	43.8	19.5	98	89.5	39.9	48	135.2	60.2	98	180.9	80.5	48	226.5	100.9	98	272.2	121.2
49	44.8	19.9	99	90.4	40.3	49	136.1	60.6	99	181.8	80.9	49	227.5	101.3	99	273.1	121.6
50	45.7	20.3	100	91.4	40.7	150	137.0	61.0	200	182.7	81.3	250	228.4	101.7	300	274.1	122.0
Dist	Dep	Lat	Di	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.9	00.4	51	46.2	21.6	101	91.5	42.7	151	136.9	63.8	201	182.2	84.9	251	227.5	106.1
2	01.8	00.8	52	47.1	22.0	02	92.4	43.1	52	137.8	64.2	02	183.1	85.4	52	228.4	106.5
3	02.7	01.3	53	48.0	22.4	03	93.3	43.5	53	138.7	64.7	03	184.0	85.8	53	229.3	106.9
4	03.6	01.7	54	48.9	22.8	04	94.3	44.0	54	139.6	65.1	04	184.9	86.2	54	230.2	107.3
5	04.5	02.1	55	49.8	23.2	05	95.2	44.4	55	140.5	65.5	05	185.8	86.6	55	231.1	107.8
6	05.4	02.5	56	50.8	23.7	106	96.1	44.8	156	141.4	65.9	206	186.7	87.1	256	232.0	108.2
7	06.3	03.0	57	51.7	24.1	07	97.0	45.2	57	142.3	66.3	07	187.6	87.5	57	232.9	108.6
8	07.3	03.4	58	52.6	24.5	08	97.9	45.6	58	143.2	66.8	08	188.5	87.9	58	233.8	109.0
9	08.2	03.8	59	53.5	24.9	09	98.8	46.1	59	144.1	67.2	09	189.4	88.3	59	234.7	109.5
10	09.1	04.2	60	54.4	25.4	10	99.7	46.5	60	145.0	67.6	10	190.3	88.7	60	235.6	109.9
11	10.0	04.6	61	55.3	25.8	111	100.6	46.9	161	145.9	68.0	211	191.2	89.2	261	236.5	110.3
12	10.9	05.0	62	56.2	26.2	12	101.5	47.3	62	146.8	68.5	12	192.1	89.6	62	237.5	110.7
13	11.8	05.5	63	57.1	26.6	13	102.4	47.8	63	147.7	68.9	13	193.0	90.0	63	238.4	111.1
14	12.7	05.9	64	58.0	27.0	14	103.3	48.2	64	148.6	69.3	14	193.9	90.4	64	239.3	111.6
15	13.6	06.3	65	58.9	27.5	15	104.2	48.6	65	149.5	69.7	15	194.9	90.9	65	240.2	112.0
16	14.5	06.8	66	59.8	27.9	116	105.1	49.0	166	150.4	70.2	216	195.8	91,3	266	241.1	112.4
17	15.4	07.2	67	60.7	28.3	17	106.0	49.4	67	151.4	70.6	17	196.7	91.7	67	242.0	112.8
18	16.3	07.6	68	61.6	28.7	18	106.9	49.9	68	152.3	71.0	18	197.6	92.1	68	242.9	113.3
19	17.2	08.0	69	62.5	29.2	19	107.8	50.3	69	153.2	71.4	19	198.5	92.5	69	243.8	113.7
20	18.1	08.5	70	63.4	29.6	20	108.8	50.7	70	154.1	71.8	20	199.4	93.0	70	244.7	114.1
21	19.0	08.9	71	64.3	30.0	121	109.7	51.1	171	155.0	72.3	221	200.3	93.4	271	245.6	114.5
22	19.9	09.3	72	65.3	30.4	22	110.6	51.6	72	155.9	72.7	22	201.2	93.8	72	246.5	114.9
23	20.8	09.7	73	66.2	30.8	23	111.5	52.0	73	156.8	73.1	23	202.1	94.2	73	247.4	115.4
24	21.8	10.1	74	67.1	31.3	24	112.4	52.4	74	157.7	73.5	24	203.0	94.7	74	248.3	115.8
25	22.7	10.6	75	68.0	31.7	25	113.3	52.8	75	158.6	74.0	25	203.9	95.1	75	249.2	116.2
26	23.6	11.0	76	68.9	32.1	126	114.2	53.2	176	159.5	74.4	226	204.8	95.5	276	250.1	116.6
27	24.5	11.4	77	69.8	32.5	27	115.1	53.7	77	160.4	74.8	27	205.7	95.9	77	251.0	117.1
28	25.4	11.8	78	70.7	33.0	28	116.0	54.1	78	161.3	75.2	28	206.6	96.4	78	252.0	117.5
29	26.3	12.3	79	71.6	33.4	29	116.9	54.5	79	162.2	75.6	29	207.5	96.8	79	252.9	117.9
30	27.2	12.7	80	72.5	33.8	30	117.8	54.9	80	163.1	76.1	30	208.4	97.2	80	253.8	118.3
31	28.1	13.1	81	73.4	34.2	131	118.7	55.4	181	164.0	76.5	231	209.4	97.6	281	254.7	118.8
32	29.0	13.5	82	74.3	34.7	32	119.6	55.8	82	164.9	76.9	32	210.3	98.0	82	255.6	119.2
33	29.9	13.9	83	75.2	35.1	33	120.5	56.2	83	165.9	77.3	33	211.2	98.5	83	256.5	119.6
34	30.8	14.4	84	76.1	35.5	34	121.4	56.6	84	166.8	77.8	34	212.1	98.9	84	257.4	120.0
35	31.7	14.8	85	77.0	35.9	35	122.4	57.1	85	167.7	78.2	35	213.0	99.3	85	258.3	120.4
36	32.6	15.2	86	77.9	36.3	136	123.3	57.5	186	168.6	78.6	236	213 9	99.7	286	259.2	120.9
37	33.5	15.6	87	78.8	36.8	37	124.2	57.9	87	169.5	79.0	37	214.8	100.2	87	260.1	121.3
38	34.4	16.1	88	79.8	37.2	38	125.1	58.3	88	170.4	79.4	38	215.7	100.6	88	261.0	121.7
39	35.3	16.5	89	80.7	37.6	39	126.0	58.7	89	171.3	79.9	39	216.6	101.0	89	261.9	122.1
40	36.3	16.9	90	81.6	38.0	40	126.9	59.2	90	172.2	80.3	40	217.5	101.4	90	262.8	122.6
41	37.2	17.3	91	82.5	38.5	141	127.8	59.6	191	173.1	80.7	241	218.4	101.8	291	263.7	123.0
42	38.1	17.7	92	83.4	38.9	42	128.7	60.0	92	174.0	81.1	42	219.3	102.3	92	264.6	123.4
43	39.0	18.2	93	84.3	39.3	43	129.6	60.4	93	174.9	81.6	43	220.2	102.7	93	265.5	123.8
44	39.9	18.6	94	85.2	39.7	44	130.5	60.9	94	175.8	82.0	44	221.1	103.1	94	266.5	124.2
45	40.8	19.0	95	86.1	40.1	45	131.4	61.3	95	176.7	82.4	45	222.0	103.5	95	267.4	124.7
46	41.7	19.4	96	87.0	40.6	146	132.3	61.7	196	177.6	82.8	246	222.9	104.0	296	268.3	125.1
47	42.6	19.9	97	87.9	41.0	47	133.2	62.1	97	178.5	83.3	47	223.9	104.4	97	269.2	125.5
48	43.5	20.3	98	88.8	41.4	48	134.1	62.5	98	179.4	83.7	48	224.8	104.8	98	270.1	125.9
49	44.4	20.7	99	89.7	41.8	49	135.0	63.0	99	180.4	84.1	49	225.7	105.2	99	271.0	126.4
50	45.3	21.1	100	90.6	42.3	150	135.9	63.4	200	181.3	84.5	250	226.6	105.7	300	271.9	126.8
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

for 65 Deg.

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.9	00.4	51	45.8	22.4	101	90.8	44.3	151	135.7	66.2	201	180.7	88.1	251	225.6	110.0
2	01.8	00.9	52	46.7	22.8	02	91.7	44.7	52	136.6	66.6	02	181.6	88.6	52	226.5	110.5
3	02.7	01.3	53	47.6	23.2	03	92.6	45.2	53	137.5	67.1	03	182.5	89.0	53	227.4	110.9
4	03.6	01.8	54	48.5	23.7	04	93.5	45.6	54	138.4	67.5	04	183.4	89.4	54	228.3	111.4
5	04.5	02.2	55	49.4	24.1	05	94.4	46.0	55	139.3	68.0	05	184.3	89.9	55	229.2	111.8
6	05.4	02.6	56	50.3	24.6	106	95.3	46.5	156	140.2	68.4	206	185.2	90.3	256	230.1	112.2
7	06.3	03.1	57	51.2	25.0	07	96.2	46.9	57	141.1	68.8	07	186.1	90.7	57	231.0	112.7
8	07.2	03.5	58	52.1	25.4	08	97.1	47.3	58	142.0	69.3	08	187.0	91,2	58	231.9	113.1
9	08.1	03.9	59	53.0	25.9	09	98.0	47.8	59	142.9	69.7	09	187.8	91.6	59	232.8	113.5
10	09.0	04.4	60	53.9	26.3	10	98.9	48.2	60	143.8	70.1	10	188.7	92.1	60	233.7	114.0
11	09.9	04.8	61	54.8	26.7	111	99.8	48.7	161	144.7	70.6	211	189.6	92.5	261	234.6	114.4
12	10.8	05.3	62	55.7	27.2	12	100.7	49.1	62	145.6	71.0	12	190.5	92.9	62	235.5	114.9
13	11.7	05.7	63	56.6	27.6	13	101.6	49.5	63	146.5	71.5	13	191.4	93.4	63	236.4	115.3
14	12.6	06.1	64	57.5	28.1	14	102.5	50.0	64	147.4	71.9	14	192.3	93.8	64	237.3	115.7
15	13.5	06.6	65	58.4	28.5	15	103.4	50.4	65	148.3	72.3	15	193.2	94.3	65	238.2	116.2
16	14.4	07.0	66	59.3	28.9	116	104.3	50.9	166	149.2	72.8	216	194.1	94.7	266	239.1	116.6
17	15.3	07.5	67	60.2	29.4	17	105.2	51.3	67	150.1	73.2	17	195.0	95.1	67	240.0	117.1
18	16.2	07.9	68	61.1	29.8	18	106.1	51.7	68	151.0	73.7	18	195.9	95.6	68	240.9	117.5
19	17.1	08.3	69	62.0	30.2	19	107.0	52.2	69	151.9	74.1	19	196.8	96.0	69	241.8	117.9
20	18.0	08.7	70	62.9	30.7	20	107.9	52.6	70	152.8	74.5	20	197.7	96.4	70	242.7	118.4
21	18.9	09.2	71	63.8	31.1	121	108.8	53.0	171	153.7	75.0	221	198.6	96.9	271	243.6	118.8
22	19.8	09.6	72	64.7	31.6	22	109.7	53.5	72	154.6	75.4	22	199.5	97.3	72	244.5	119.2
23	20.7	10.1	73	65.6	32.0	23	110.6	53.9	73	155.5	75.8	23	200.4	97.8	73	245.4	119.7
24	21.6	10.5	74	66.5	32.4	24	111.5	54.4	74	156.4	76.3	24	201.3	98 2	74	246.3	120.1
25	22.5	11.0	75	67.4	32.9	25	112.4	54.8	75	157.3	76.7	25	202.2	98.6	75	247.2	120.6
26	23.4	11.4	76	68.3	33.3	126	113.2	55.2	176	158.2	77.2	226	203.1	99.1	276	248.1	121.0
27	24.3	11.8	77	69.2	33.8	27	114.1	55.7	77	159.1	77.6	27	204.0	99.5	77	249.0	121.4
28	25.2	12.3	78	70.1	34.2	28	115.0	56.1	78	160.0	78.0	28	204.9	100.0	78	249.9	121.9
29	26.1	12.7	79	71.0	34.6	29	115.9	56.6	79	160.9	78.5	29	205.8	100.4	79	250.8	122.3
30	27.0	13.2	80	71.9	35.1	30	116.8	57.0	80	161.8	78.9	30	206.7	100.8	80	251.7	122.8
31	27.9	13.6	81	72.8	35.5	131	117.7	57.4	181	162.7	79.4	231	207 6	101.3	281	252.6	123.2
32	28.8	14.0	82	73.7	35.9	32	118.6	57.9	82	163.6	79.8	32	208.5	101.7	82	253.5	123.6
33	29.7	14.5	83	74.6	36.4	33	119.5	58.3	83	164.5	80.2	33	209.4	102.1	83	254.4	124.1
34	30.6	14.9	84	75.5	36.8	34	120.4	58.7	84	165.4	80.7	34	210.3	102.6	84	255.3	124.5
35	31.5	15.3	85	76.4	37.3	35	121.3	59.2	85	166.3	81.1	35	211.2	103.0	85	256.2	124.9
36	32.4	15.8	86	77.3	37.7	136	122.2	59.6	186	167.2	81.5	236	212.1	103.5	286	257.1	125.4
37	33.3	16.2	87	78.2	38.1	37	123.1	60.1	87	168.1	82.0	37	213.0	103.9	87	258.0	125.8
38	34.2	16.7	88	79.1	38.6	38	124.0	60.5	88	169.0	82.4	38	213 9	104.3	88	258.9	126.3
39	35.1	17.1	89	80.0	39.0	39	124.9	60.9	89	169.9	82.9	39	214.8	104.8	89	259.8	126.7
40	36.0	17.5	90	80.9	39.5	40	125.8	61.4	90	170.8	83.3	40	215.7	105.2	90	260.7	127.1
41	36.9	18.0	91	81.8	39.9	141	126.7	61.8	191	171.7	83.7	241	216.6	105.7	291	261.6	127.6
42	37.7	18.4	92	82.7	40.3	42	127.6	62.3	92	172.6	84.2	42	217.5	106.1	92	262.4	128.0
43	38.6	18.9	93	83.6	40.8	43	128.5	62.7	93	173.5	84.6	43	218.4	106.5	93	263.3	128.5
44	39.5	19.3	94	84.5	41.2	44	129.4	63.1	94	174.4	85.0	44	219.3	107.0	94	264.2	128.9
45	40.4	19.7	95	85.4	41.6	45	130.3	63.6	95	175.3	85.5	45	220.2	107.4	95	265.1	129.3
46	41.3	20.2	96	86.3	42.1	146	131.2	64.0	196	176.2	85.9	246	221.1	107.8	296	266.0	129.8
47	42.2	20.6	97	87.2	42.5	47	132.1	64.4	97	177.1	86.4	47	222.0	108.3	97	266.9	130.2
48	43.1	21.0	98	88.1	43.0	48	133.0	64.9	98	178.0	86.8	48	222.9	108.7	98	267.8	130.6
49	44.0	21.5	99	89.0	43.4	49	133.9	65.3	99	178.9	87.2	49	223.8	109.2	99	268.7	131.1
50	44.9	21.9	100	89.9	43.8	150	134.8	65.8	200	179.8	87.7	250	224.7	109.6	300	269.6	131.5
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.9	00.5	51	45.4	23.2	101	90.0	45.9	151	134.5	68.6	201	179.1	91.3	251	223.6	114.0
2	01.8	00.9	52	46.3	23.6	02	90.9	46.3	52	135.4	69.0	02	180.0	91.7	52	224.5	114.4
3	02.7	01.4	53	47.2	24.1	03	91.8	46.8	53	136.3	69.5	03	180.9	92.2	53	225.4	114.9
4	03.6	01.8	54	48.1	24.5	04	92.7	47.2	54	137.2	69.9	04	181.8	92.6	54	226.3	115.3
5	04.5	02.3	55	49.0	25.0	05	93.6	47.7	55	138.1	70.4	05	182.7	93.1	55	227.2	115.8
6	05.3	02.7	56	49.9	25.4	106	94.4	48.1	156	139.0	70.8	206	183.5	93.5	256	228.1	116.2
7	06.2	03.2	57	50.8	25.9	07	95.3	48.6	57	139.9	71.3	07	184.4	94.0	57	229.0	116.7
8	07.1	03.6	58	51.7	26.3	08	96.2	49.0	58	140.8	71.7	08	185.3	94.4	58	229.9	117.1
9	08.0	04.1	59	52.6	26.8	09	97.1	49.5	59	141.7	72.2	09	186.2	94.9	59	230.8	117.6
10	08.9	04.5	60	53.5	27.2	10	98.0	49.9	60	142.6	72.6	10	187.1	95.3	60	231.7	118.0
11	09.8	05.0	61	54.4	27.7	111	98.9	50.4	161	143.5	73.1	211	188.0	95.8	261	232.6	118.5
12	10.7	05.4	62	55.2	28.1	12	99.8	50.8	62	144.3	73.5	12	188.9	96.2	62	233.4	118.9
13	11.6	05.9	63	56.1	28.6	13	100.7	51.3	63	145.2	74.0	13	189.8	96.7	63	234.3	119.4
14	12.5	06.4	64	57.0	29.1	14	101.6	51.8	64	146.1	74.5	14	190.7	97.2	64	235.2	119.9
15	13.4	06.8	65	57.9	29.5	15	102.5	52.2	65	147.0	74.9	15	191.6	97.6	65	236.1	120.3
16	14.3	07.3	66	58.8	30.0	116	103.4	52.7	166	147.9	75.4	216	192.5	98.1	266	237.0	120.8
17	15.1	07.7	67	59.7	30.4	17	104.2	53.1	67	148.8	75.8	17	193.3	98.5	67	237.9	121.2
18	16.0	08.2	68	60.6	30.9	18	105.1	53.6	68	149.7	76.3	18	194.2	99.0	68	238.8	121.7
19	16.9	08.6	69	61.5	31.3	19	106.0	54.0	69	150.6	76.7	19	195.1	99.4	69	239.7	122.1
20	17.8	09.1	70	62.4	31.8	20	106.9	54.5	70	151.5	77.2	20	196.0	99.9	70	240.6	122.6
21	18.7	09.5	71	63.3	32.2	121	107.8	54.9	171	152.4	77.6	221	196.9	100.3	271	241.5	123.3
22	19.6	10.0	72	64.2	32.7	22	108.7	55.4	72	153.3	78.1	22	197.8	100.8	72	242.4	123.5
23	20.5	10.4	73	65.0	33.1	23	109.6	55.8	73	154.1	78.5	23	198.7	101.2	73	243.2	123.9
24	21.4	10.9	74	65.9	33.6	24	110.5	56.3	74	155.0	79.0	24	199.6	101.7	74	244.1	124.4
25	22.3	11.4	75	66.8	34.1	25	111.4	56.8	75	155.9	79.5	25	200.5	102.2	75	245.0	124.9
26	23.2	11.8	76	67.7	34.5	126	112.3	57.2	176	156.8	79.9	226	201.4	102.6	276	245.9	125.3
27	24.1	12.3	77	68.6	35.0	27	113.2	57.7	77	157.7	80.4	27	202.3	103.1	77	246.8	125.8
28	24.9	12.7	78	69.5	35.4	28	114.0	58.1	78	158.6	80.8	28	203.1	103.5	78	247.7	126.2
29	25.8	13.2	79	70.4	35.9	29	114.9	58.6	79	159.5	81.3	29	204.0	104.0	79	248.6	126.7
30	26.7	13.6	80	71.3	36.3	30	115.8	59.0	80	160.4	81.7	30	204.9	104.4	80	249.5	127.1
31	27.6	14.1	81	72.2	36.8	131	116.7	59.5	181	161.3	82.2	231	205.8	104.9	281	250.4	127.6
32	28.5	14.5	82	73.1	37.2	32	117.6	59.9	82	162.2	82.6	32	206.7	105.3	82	251.3	128.0
33	29.4	15.0	83	74.0	37.7	33	118.5	60.4	83	163.1	83.1	33	207.6	105.8	83	252.2	128.5
34	30.3	15.4	84	74.8	38.1	34	119.4	60.8	84	163.9	83.5	34	208.5	106.2	84	253.0	128.9
35	31.2	15.9	85	75.7	38.6	35	120.3	61.3	85	164.8	84.0	35	209.4	106.7	85	253.9	129.4
36	32.1	16.3	86	76.6	39.0	136	121.2	61.7	186	165.7	84.4	236	210.3	107.1	286	254.8	129.8
37	33.0	16.8	87	77.5	39.5	37	122.1	62.2	87	166.6	84.9	37	111.2	107.6	87	255.7	130.3
38	33.9	17.3	88	78.4	40.0	38	123.0	62.7	88	167.5	85.4	38	212.1	108.1	88	256.6	130.8
39	34.7	17.7	89	79.3	40.4	39	123.8	63.1	89	168.4	85.8	39	212.9	108.5	89	257.5	131.2
40	35.6	18.2	90	80.2	40.9	40	124.7	63.6	90	169.3	86.3	40	213.8	109.0	90	258.4	131.7
41	36.5	18.6	91	81.1	41.3	141	125.6	64.0	191	170.2	86.7	241	214.7	109.4	291	259.3	132.1
42	37.4	19.1	92	82.0	41.8	42	126.5	64.5	92	171.1	87.2	42	215.6	109.9	92	260.2	132.6
43	38.3	19.5	93	82.9	42.2	43	127.4	64.9	93	172.0	87.6	43	216.5	110.3	93	261.1	133.0
44	39.2	20.0	94	83.8	42.7	44	128.3	65.4	94	172.9	88.1	44	217.4	110.8	94	262.0	133.5
45	40.1	20.4	95	84.6	43.1	45	129.2	65.8	95	173.7	88.5	45	218.3	111.2	95	262.8	133.9
46	41.0	20.9	96	85.5	43.6	146	130.1	66.3	196	174.6	89.0	246	219.2	111.7	296	263.7	134.4
47	41.9	21.3	97	86.4	44.0	47	131.0	66.7	97	175.5	89.4	47	220.1	112.1	97	264.6	134.8
48	42.8	21.8	98	87.3	44.5	48	131.9	67.2	98	176.4	89.9	48	221.0	112.6	98	265.5	135.3
49	43.7	22.2	99	88.2	44.9	49	152.8	67.6	99	177.3	90.3	49	221.9	113.0	99	266.4	135.7
50	44.6	22.7	100	89.1	45.4	150	133.7	68.1	200	178.2	90.8	250	222.8	113.5	300	267.3	136.2
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

for 63 Deg.

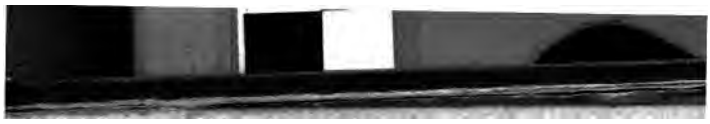
Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.9	00.5	51	45.0	23.9	101	89.2	47.4	151	133.3	70.9	201	177.5	94.4	251	221.6	117.8
2	01.8	00.9	52	45.9	24.4	02	90.1	47.9	52	134.2	71.4	02	178.4	94.8	52	222.5	118.3
3	02.6	01.4	53	46.8	24.9	03	90.9	48.4	53	135.1	71.8	03	179.2	95.3	53	223.4	118.8
4	03.5	01.9	54	47.7	25.4	04	91.8	48.8	54	136.0	72.3	04	180.1	95.8	54	224.3	119.2
5	04.4	02.3	55	48.6	25.8	05	92.7	49.3	55	136.9	72.8	05	181.0	96.2	55	225.2	119.7
6	05.3	02.8	56	49.4	26.3	106	93.6	49.8	156	137.7	73.2	206	181.9	96 7	256	226.0	120.2
7	06.2	03.3	57	50.3	26.8	07	94.5	50.2	57	138.6	73.7	07	182.8	97.2	57	226.9	120.7
8	07.1	03.8	58	51.2	27.2	08	95.4	50.7	58	139.5	74.2	08	183.7	97.7	58	227.8	121.1
9	07.9	04.3	59	52.1	27.7	09	96.2	51.2	59	140.4	74.6	09	184.5	98.1	59	228.7	121.6
10	08.8	04.7	60	53.0	28.2	10	97.1	51.6	60	141.3	75.1	10	185.4	98.6	60	229.6	122.1
11	09.7	05.2	61	53.9	28.6	111	98.0	52.1	161	142.2	75.6	211	186.3	99.1	261	230.5	122.5
12	10.6	05.6	62	54.7	29.1	12	98.9	52.6	62	143.0	76.1	12	187.2	99.5	62	231.3	123.0
13	11.5	06.1	63	55.6	29.6	13	99.8	53.1	63	143.9	76.5	13	188.1	100.0	63	232.2	123.5
14	12.4	06.6	64	56.5	30.0	14	100.7	53.5	64	144.8	77.0	14	189.0	100.5	64	233.1	123.9
15	13.2	07.0	65	57.4	30.5	15	101.5	54.0	65	145.7	77.5	15	189.8	100.9	65	234.0	124.4
16	14.1	07.5	66	58.3	31.0	116	102.4	54.5	166	146.6	77.9	216	190.7	101.4	266	234.9	124.9
17	15.0	08.0	67	59.2	31.5	17	103.3	54.9	67	147.5	78.4	17	191.6	101.9	67	235.8	125.4
18	15.9	08.5	68	60.0	31.9	18	104.2	55.4	68	148.3	78.9	18	192.5	102.4	68	236.6	125.8
19	16.8	08.9	69	60.9	32.4	19	105.1	55.9	69	149.2	79.3	19	193.4	102.8	69	237.5	126.3
20	17.7	09.4	70	61.8	32.9	20	106.0	56.3	70	150.1	79.8	20	194.3	103.3	70	238.4	126.8
21	18.5	09.9	71	62.7	33.3	121	106.8	56.8	171	151.0	80.3	221	195.1	103.8	271	239.3	127.2
22	19.4	10.3	72	63.6	33.8	22	107.7	57.3	72	151.9	80.8	22	196.0	104.2	72	240.2	127.7
23	20.3	10.8	73	64.5	34.3	23	108.6	57.7	73	152.8	81.2	23	196.9	104.7	73	241.1	128.2
24	21.2	11.3	74	65.3	34.7	24	109.5	58.2	74	153.6	81.7	24	197.8	105.2	74	241.9	128.6
25	22.1	11.7	75	66.2	35.2	25	110.4	58.7	75	154.5	82.2	25	198.7	105.6	75	242.8	129.1
26	23.0	12.2	76	67.1	35.7	126	111.3	59.2	176	155.4	82.6	226	199.6	106.1	276	243.7	129.6
27	23.8	12 7	77	68.0	36.2	27	112.1	59.6	77	156.3	83.1	27	200.4	106.6	77	244.6	130.1
28	24.7	13.1	78	68.9	36.6	28	113.0	60.1	78	157.2	83.6	28	201.3	107.0	78	245.5	130.5
29	25.6	13.6	79	69.8	37.1	29	113.9	60.6	79	158.1	84.0	29	202.2	107.5	79	246.4	131.0
30	26.5	14.1	80	70.6	37.6	30	114.8	61.0	80	158.9	84.5	30	203.1	108.0	80	247.2	131.5
31	27.4	14.6	81	71.5	38.0	131	115.7	61.5	181	159.8	85.0	231	204.0	108.5	281	248.1	131.9
32	28.3	15.0	82	72.4	38.5	32	116.6	62.0	82	160.7	85.4	32	204.9	108.9	82	249.0	132.4
33	29.1	15.5	83	73.3	39.0	33	117.4	62.4	83	161.6	85.9	33	205.7	109.4	83	249.9	132.9
34	30.0	16.0	84	74.2	39.4	34	118.3	62.9	84	162.5	86.4	34	206.6	109.9	84	250.8	133.3
35	30.9	16.4	85	75.1	39.9	35	119.2	63.4	85	163.4	86.9	35	207.5	110.3	85	251.7	133.8
36	31.8	16.9	86	75.9	40.4	136	120.1	63.9	186	164.2	87.3	236	208.4	110.8	286	252.5	134.3
37	32.7	17.4	87	76.8	40.8	37	121.0	64.3	87	165.1	87.8	37	209.3	111.3	87	253.4	134.7
38	33.6	17.8	88	77.7	41.3	38	121.9	64.8	88	166.0	88 3	38	210.2	111.7	88	254.3	135.2
39	34.4	18.3	89	78.6	41.8	39	122.7	65.3	89	166.9	88.7	39	211.0	112.2	89	255.2	135.7
40	35.3	18.8	90	79.5	42.3	40	123.6	65.7	90	167.8	89.2	40	211.9	112.7	90	256.1	136.2
41	36.2	19.2	91	80.4	42.7	141	124.5	66.2	191	168.7	89.7	241	212.8	113.1	291	257.0	136.6
42	37.1	19.7	92	81.2	43.2	42	125.4	66.7	92	169.5	90.1	42	213.7	113.6	92	257.8	137.1
43	38.0	20.2	93	82.1	43.7	43	126.3	67.1	93	170.4	90.6	43	214.6	114.1	93	258.7	137.6
44	38.9	20.7	94	83.0	44.1	44	127.2	67.6	94	171.3	91.1	44	215.5	114.6	94	259.6	138.0
45	39.7	21.1	95	83.9	44.6	45	128.0	68.1	95	172.2	91.6	45	216.3	115.0	95	260.5	138.5
46	40.6	21.6	96	84.8	45.1	146	128.9	68.5	196	173.1	92.0	246	217.2	115.5	296	261.4	139.0
47	41.5	22.1	97	85.7	45.5	47	129.8	69.0	97	174.0	92.5	47	218.1	115.9	97	262.3	139.4
48	42.4	22.5	98	86.5	46.0	48	130.7	69.5	98	174.8	93.0	48	219.0	116.4	98	263.1	139.9
49	43.3	23.0	99	87.4	46.5	49	131.6	70.0	99	175.7	93.4	49	219.9	116.9	99	264.0	140.4
50	44.2	23.5	100	88.3	47.0	150	132.5	70.4	200	176.6	93.9	250	220.8	117.4	300	264.9	140,9
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.9	00.5	51	44.6	24.7	101	88.3	49.0	151	132.1	73.2	201	175.8	97.4	251	219.5	121.7
2	01.7	01.0	52	45.5	25.2	02	89.2	49.4	52	132.9	73.7	02	176.7	97.9	52	220.4	122.2
3	02.6	01.5	53	46.4	25.7	03	90.1	49.9	53	133.8	74.2	03	177.5	98.4	53	221.3	122.7
4	03.5	01.9	54	47.2	26.2	04	91.0	50.4	54	134.7	74.7	04	178.4	98.9	54	222.2	123.1
5	04.4	02.4	55	48.1	26.7	05	91.8	50.9	55	135.6	75.1	05	179.3	99.4	55	223.0	123.6
6	05.2	02.9	56	49.0	27.1	106	92.7	51.4	156	136.4	75.6	206	180.2	99.9	256	223.9	124.1
7	06.1	03.4	57	49.9	27.6	07	93.6	51.9	57	137.3	76.1	07	181.0	100.4	57	224.8	124.6
8	07.0	03.9	58	50.7	28.1	08	94.5	52.4	58	138.2	76.6	08	181.9	100.8	58	225.6	125.1
9	07.9	04.4	59	51.6	28.6	09	95.3	52.8	59	139.1	77.1	09	182.8	101.3	59	226.5	125.6
10	08.7	04.8	60	52.5	29.1	10	96.2	53.3	60	139.9	77.6	10	183.7	101.8	60	227.4	126.0
11	09.6	05.3	61	53.4	29.6	111	97.1	53 8	161	140.8	78.1	211	184.5	102.3	261	228.3	126.5
12	10.5	05.8	62	54.2	30.1	12	98.0	54.3	62	141.7	78.5	12	185.4	102.8	62	229.1	127.0
13	11.4	06.3	63	55.1	30.5	13	98.8	54.8	63	142.6	79.0	13	186.3	103.3	63	230.0	127.5
14	12.2	06.8	64	56.0	31.0	14	99.7	55.3	64	143.4	79.5	14	187.2	103.7	64	230.9	128.0
15	13.1	07.3	65	56.8	31.5	15	100.6	55.8	65	144.3	80.0	15	188.0	104.2	65	231.8	128.5
16	14.0	07.8	66	57.7	32.0	116	101.5	56.2	166	145.2	80.5	216	188.9	104.7	266	232.6	129.0
17	14.9	08.2	67	58.6	32.5	17	102.3	56.7	67	146.1	81.0	17	189.8	105.2	67	233.5	129.4
18	15.7	08.7	68	59.5	33.0	18	103.2	57.2	68	146.9	81.4	18	190.7	105.7	68	234.4	129.9
19	16.6	09.2	69	60.3	33.5	19	104.1	57.7	69	147.8	81.9	19	191.5	106.2	69	235.3	130.4
20	17.5	09.7	70	61.2	33.9	20	105.0	58.2	70	148.7	82.4	20	192.4	106.7	70	236.1	130.9
21	18.4	10.2	71	62.1	34.4	121	105.8	58.7	171	149.6	82.9	221	193.3	107.1	271	237.0	131.4
22	19.2	10.7	72	63.0	34.9	22	106.7	59.1	72	150.4	83.4	22	194.2	107.6	72	237.9	131.9
23	20.1	11.2	73	63.8	35.4	23	107.6	59.6	73	151.3	83.9	23	195.0	108.1	73	238.8	132.4
24	21.0	11.6	74	64.7	35.9	24	108.5	60.1	74	152.2	84.4	24	195.9	108.6	74	239.6	132.8
25	21.9	12.1	75	65.6	36.4	25	109.3	60.6	75	153.1	84.8	25	196.8	109.1	75	240.5	133.3
26	22.7	12.6	76	66.5	36.8	126	110.2	61.1	176	153.9	85.3	226	197.7	109.6	276	241.4	133.8
27	23.6	13.1	77	67.3	37.3	27	111.1	61.6	77	154.8	85.8	27	198.5	110.0	77	242.3	134.3
28	24.5	13.6	78	68.2	37.8	28	111.9	62.1	78	155.7	86.3	28	199.4	110.5	78	243.1	134.8
29	25.4	14.1	79	69.1	38.3	29	112.8	62.5	79	156.6	86.8	29	200.3	111.0	79	244.0	135.3
30	26.2	14.5	80	70.0	38.8	30	113.7	63.0	80	157.4	87.3	30	201.2	111.5	80	244.9	135.7
31	27.1	15.0	81	70.8	39.3	131	114.6	63.5	181	158.3	87.7	231	202.0	112.0	281	245.8	136.2
32	28.0	15.5	82	71.7	39.8	32	115.4	64.0	82	159.2	88.2	32	202.9	112.5	82	246.6	13.67
33	28.9	16.0	83	72.6	40.2	33	116.3	64.5	83	160.1	88.7	33	203.8	113.0	83	247.5	137.2
34	29.7	16.5	84	73.5	40.7	34	117.2	65.0	84	160.9	89.2	34	204.7	113.4	84	248.4	137.7
35	30.6	17.0	85	74.3	41.2	35	118.1	65.4	85	161.8	89.7	35	205.5	113.9	85	249.3	138.2
36	31.5	17.5	86	75.2	41.7	136	118.9	65 9	186	162.7	90.2	236	206.4	114.4	286	250.1	138.7
37	32.4	17.9	87	76.1	42.2	37	119.8	66.4	87	163.6	90.7	37	207.3	114.9	87	251.0	139.1
38	33.2	18.4	88	77.0	42.7	38	120.7	66.9	88	164.4	91.1	38	208.2	115.4	88	251.9	139.6
39	34.1	18.9	89	77.8	43.1	39	121.6	67.4	89	165.3	91.6	39	209.0	115.9	89	252.8	140.1
40	35.0	19.4	90	78.7	43.6	40	122.4	67.9	90	166.2	92.1	40	209.9	116.4	90	253.6	140.6
41	35.9	19.9	91	79.6	44.1	141	123.3	68.4	191	167.0	92.6	241	210.8	116.8	291	254.5	141.1
42	36.7	20.4	92	80.5	44.6	42	124.2	68.8	92	167.9	93.1	42	111.7	117.3	92	255.4	141.6
43	37.6	20.8	93	81.3	45.1	43	125.1	69.3	93	168.8	93.6	43	212.5	117.8	93	256.3	142.0
44	38.5	21.3	94	82.2	45.6	44	125.9	69.8	94	169.7	94.1	44	213.4	118.3	94	257.1	142.5
45	39.4	21.8	95	83.1	46.1	45	126.8	70.3	95	170.5	94.5	45	214.3	118.8	95	258.0	143.0
46	40.2	22.3	96	84.0	46.5	146	127.7	708	196	171.4	95.0	246	215.2	119.3	296	258 9	143.5
47	41.1	22.8	97	84.8	47.0	47	128.6	71.3	97	172.3	95.5	47	216.0	119.7	97	259.8	144.0
48	42.0	23.3	98	85.7	47.5	48	129.4	71.8	98	173.2	96.0	48	216.9	120.2	98	260.6	144.5
49	42.9	23.8	99	86.6	48.0	49	130.3	72.2	99	174.0	96.5	49	217.8	120.7	99	261.5	145.0
50	43.7	24.2	100	87.5	48.5	150	131.2	72.7	200	174.9	97.0	250	218.7	121.2	300	262.4	145.4
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.9	00.5	51	44.2	25.5	101	87.5	50.5	151	130.8	75.5	201	174.1	100.5	251	217.4	125.5
2	01.7	01.0	52	45.0	26.0	02	88.3	51.0	52	131.6	76.0	02	174.9	101.0	52	218.2	126.0
3	02.6	01.5	53	45.9	26.5	03	89.2	51.5	53	122.5	76.5	03	175.8	101.5	53	219.1	126.5
4	03.5	02.0	54	46.8	27.0	04	90.1	52.0	54	133.4	77.0	04	176.7	102.0	54	220.0	127.0
5	04.3	02.5	55	47.6	27.5	05	90.9	52.5	55	134.2	77.5	05	177.5	102.5	55	220.8	127.5
6	05.2	03.0	56	48.5	28.0	106	91.8	53.0	156	135.1	78.0	206	178.4	103.0	256	221.7	128.0
7	06.1	03.5	57	49.4	28.5	07	92.7	53.5	57	136.0	78 5	07	179.3	103.5	57	222.6	128.5
8	06.9	04.0	58	50.2	29.0	08	93.5	54.0	58	136.8	79.0	08	180.1	104.0	58	223.4	129.0
9	07.8	04.5	59	51.1	29.5	09	94.4	54.5	59	137.7	79.5	09	181.0	104.5	59	224.3	129.5
10	08.7	05.0	60	52.0	30.0	10	95.3	55.0	60	138.6	80.0	10	181.9	105.0	60	225.2	130.0
11	09.5	05.5	61	52.8	30.5	111	96.1	55.5	161	139.4	80.5	211	182.7	105.5	261	226.0	130.5
12	10.4	06.0	62	53.7	31.0	12	97.0	56.0	62	140.3	81.0	12	183.6	106.0	62	226.9	131.0
13	11.3	06.5	63	54.6	31.5	13	97.9	56.5	63	141.2	81.5	13	184.5	106.5	63	227.8	131.5
14	12.1	07.0	64	55.4	32.0	14	98.7	57.0	64	142.0	82.0	14	185.3	107.0	64	228.6	132.0
15	13.0	07.5	65	56.3	32.5	15	99.6	57.5	65	142.9	82.5	15	186.2	107.5	65	229.5	132.5
16	13.9	08.0	66	57.2	33.0	116	100.5	58.0	166	143.8	83.0	216	187.1	108.0	266	230.4	133.0
17	14.7	08.5	67	58.0	33.5	17	101.3	58.5	67	144.6	83.5	17	187.9	108.5	67	231.2	133.5
18	15.6	09.0	68	58.9	34.0	18	102.2	59.0	68	145.5	84.0	18	188.8	109.0	68	232.1	134.0
19	16.5	09.5	69	59.8	34.5	19	103.1	59.5	69	146.4	84.5	19	189.7	109.5	69	233.0	134.5
20	17.3	10.0	70	60.6	35.0	20	103.9	60.0	70	147.2	85.0	20	190.5	110.0	70	233.8	135.0
21	18.2	10.5	71	61.5	35.5	121	104.8	60.5	171	148.1	85.5	221	191.4	110.5	271	234.7	135.5
22	19.1	11.0	72	62.4	36.0	22	105.7	61.0	72	149.0	86.0	22	192.3	111.0	72	235.6	136.0
23	19.9	11.5	73	63.2	36.5	23	106.5	61.5	73	149.8	86.5	23	193.1	111.5	73	236.4	136.5
24	20.8	12.0	74	64.1	37.0	24	107.4	62.0	74	150.7	87.0	24	194.0	112.0	74	237.3	137.0
25	21.7	12 5	75	65.0	37.5	25	108.3	62.5	75	151.6	87.5	25	194.9	112.5	75	238.2	137.5
26	22.5	13.0	76	65.8	38.0	126	109.1	63.0	176	152.4	88 0	226	195.7	113.0	276	259.0	138.0
27	23.4	13.5	77	66.7	38.5	27	110.0	63.5	77	153.3	88.5	27	196.6	113.5	77	239.9	138.5
28	24.2	14.0	78	67.5	39.0	28	110.8	64.0	78	154.1	89.0	28	197.4	114.0	78	240.7	139.0
29	25.1	14.5	79	68.4	39.5	29	111.7	64.5	79	155.0	89.5	29	198.3	114.5	79	241.6	139.5
30	26.0	15.0	80	69.3	40.0	30	112.6	65.0	80	155.9	90.0	30	199.2	115.0	80	242.5	140.0
31	26.8	15.5	81	70.1	40.5	131	113.4	65.5	181	156.7	90.5	231	200.0	115.5	281	243.3	140.5
32	27.7	16.0	82	71.0	41.0	32	114.3	66.0	82	157.6	91.0	32	200.9	116.0	82	244.2	141.0
33	28.6	16.5	83	71.9	41.5	33	115.2	66.5	83	158.5	91.5	33	201.8	116.5	83	245.1	141.5
34	29.4	17.0	84	72.7	42.0	34	116.0	67.0	84	159.3	92.0	34	202.6	117.0	84	245.9	142.0
35	30.3	17.5	85	73.6	42.5	35	116.9	67.5	85	160.2	92.5	35	203.5	117.5	85	246.8	142.5
36	31.2	18.0	86	74.5	43.0	136	117.8	68.0	186	161.1	93.0	236	204.4	118.0	286	247.7	143.0
37	32.0	18.5	87	75.3	43.5	37	118.6	68.5	87	161.9	93.5	37	205.2	118.5	87	248.5	143.5
38	32.9	19.0	88	76.2	44.0	38	119.5	69.0	88	162.8	94.0	38	206.1	119.0	88	249.4	144.0
39	33.8	19.5	89	77.1	44.5	39	120.4	69.5	89	163.7	94.5	39	207.0	119.5	89	250.3	144.5
40	34.6	20.0	90	77.9	45.0	40	121.2	70.0	90	164.5	95.0	40	207.8	120.0	90	251.1	145.0
41	35.5	20.5	91	78.8	45.5	141	122.1	70.5	191	165.4	95.5	241	208.7	120.5	291	252.0	145.5
42	36.4	21.0	92	79.7	46.0	42	123.0	71.0	92	166.3	96.0	42	209.6	121.0	92	252.9	146.0
43	37.2	21.5	93	80.5	46.5	43	123.8	71.5	93	167.1	96.5	43	210.4	121.5	93	253.7	146.5
44	38.1	22.0	94	81.4	47.0	44	124.7	72.0	94	168.0	97.0	44	211.3	122.0	94	254.6	147.0
45	39.0	22.5	95	82.3	47.5	45	125.6	72.5	95	168.9	97.5	45	212.2	122.5	95	255.5	147.5
46	39.8	23.0	96	83.1	48.0	146	126.4	73.0	196	169.7	98.0	246	213.0	123.0	296	256.3	148.0
47	40.7	23.5	97	84.0	48.5	47	127.3	73.5	97	170.6	98.5	47	213.9	123.5	97	257.2	148.5
48	41.6	24.0	98	84.9	49.0	48	128.2	74.0	98	171.5	99.0	48	214.8	124.0	98	258.1	149.0
49	42.4	24.5	99	85.7	49.5	49	129.0	74.5	99	172.3	99.5	49	215.6	124.5	99	258.9	149.5
50	43.3	25.0	100	86.6	50.0	150	129.9	75.0	200	173.2	100.0	250	216.5	125.0	300	259.8	150.0
Dist	Dep	Lat		Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.9	00.5	51	43.7	26.3	101	86 6	52.0	151	129.4	77.8	201	172 3	103.5	251	215.1	129.3
2	01.7	01.0	52	44.6	26.8	02	87.4	52.5	52	130.3	78.3	02	173.1	104.0	52	216.0	129.8
3	02.6	01.5	53	45.4	27.3	03	88.3	53.0	53	131.1	78.8	03	174.0	104.5	53	216.8	130.3
4	03.4	02.1	54	46.3	27.8	04	89.1	53.6	54	132.0	79.3	04	174.8	105.1	54	217 7	130.8
5	04.3	02.6	55	47.1	28.3	05	90.0	54.1	55	132.8	79.8	05	175.7	105.6	55	218.5	131.3
6	05.1	03.1	56	48.0	28.8	106	90.8	54.6	156	133.7	80.3	206	176.5	106.1	256	219.4	131.8
7	06.0	03.6	57	48.8	29.4	07	91.7	55.1	57	134.5	80.9	07	177.4	106.6	57	220.2	132.4
8	06.9	04.1	58	49.7	29.9	08	92.6	55.6	58	135.4	81.4	08	178.3	107.1	58	221.1	132.9
9	07.7	04.6	59	50.6	30.4	09	93.4	56.1	59	136.3	81.9	09	179.1	107.6	59	222.0	133.4
10	08.6	05.2	60	51.4	30.9	10	94.3	56.7	60	137.1	82.4	10	180.0	108.2	60	222.8	133.9
11	09.4	05.7	61	52.3	31.4	111	95.1	57.2	161	138.0	82.9	211	180.8	108.7	261	223.7	134.4
12	10.3	06.2	62	53.1	31.9	12	96.0	57.7	62	138.8	83.4	12	181.7	109.2	62	224.5	134.9
13	11.1	06.7	63	54.0	32.4	13	96.8	58.2	63	139.7	83.9	13	182.5	109.7	63	225.4	135.4
14	12.0	07.2	64	54.8	33.0	14	97.7	58.7	64	140.5	84.5	14	183.4	110.2	64	226.2	136.0
15	12.9	07.7	65	55.7	33.5	15	98.6	59.2	65	141.4	85.0	15	184.3	110.7	65	227.1	136.5
16	13.7	08.2	66	56.6	34.0	116	99.4	59.7	166	142.3	85.5	216	185.1	111.2	266	228.0	137.0
17	14.6	08.8	67	57.4	34.5	17	100.3	60.3	67	143.1	86.0	17	186.0	111.8	67	228.8	137.5
18	15.4	09.3	68	58.3	35.0	18	101.1	60.8	68	144.0	86.5	18	186.8	112.3	68	229.7	138.0
19	16.3	09.8	69	59.1	35.5	19	102.0	61.3	69	144.8	87.0	19	187.7	112.8	69	230.5	138.5
20	17.1	10.3	70	60.0	36.1	20	102.8	61.8	70	145.7	87.6	20	188.5	113.3	70	231.4	139.1
21	18.0	10.8	71	60.8	36.6	121	103.7	62.3	171	146.5	88.1	221	189.4	113.8	271	232.2	139.6
22	18.9	11.3	72	61.7	37.1	22	104.6	62.8	72	147.4	88.6	22	190.3	114.3	72	233.1	140.1
23	19.7	11.8	73	62.6	37.6	23	105.4	63.3	73	148.3	89.1	23	191.1	114.8	73	234.0	140.6
24	20.6	12.4	74	63.4	38.1	24	106.3	63.9	74	149.1	89.6	24	192.0	115.4	74	234.8	141.1
25	21.4	12.9	75	64.3	38.6	25	107.1	64.4	75	150.0	90.1	25	192.8	115.9	75	235.7	141.6
26	22.3	13.4	76	65.1	39.1	126	108.0	64.9	176	150.8	90.6	226	193.7	116.4	276	236.5	142.1
27	23.1	13.9	77	66.0	39.7	27	108.8	65.4	77	151.7	91.2	27	194.5	116.9	77	237.4	142.7
28	24.0	14.4	78	66.8	40.2	28	109.7	65.9	78	152 5	91.7	28	195.4	117.4	78	238.2	143.2
29	24.9	14.9	79	67.7	40.7	29	110.6	66.4	79	153.4	92.2	29	196.3	117.9	79	239.1	143.7
30	25.7	15.5	80	68.6	41.2	30	111.4	67.0	80	154.3	92.7	30	197.1	118.5	80	240.0	144.2
31	26.6	16.0	81	69.4	41.7	131	112.3	67.5	181	155.1	93.2	231	198.0	119.0	281	240.8	144.7
32	27.4	16.5	82	70.3	42.2	32	113.1	68.0	82	156.0	93.7	32	198.8	119.5	82	241.7	145.2
33	28.3	17.0	83	71.1	42.7	33	114.0	68.5	83	156.8	94.2	33	199.7	120.0	83	242.5	145.7
34	29.1	17.5	84	72.0	43.3	34	114.8	69.0	84	157.7	94.8	34	200.5	120.5	84	243.4	146.3
35	30.0	18.0	85	72.8	43.8	35	115.7	69.5	85	158.5	95.3	35	201.4	121.0	85	244.2	146.8
36	30.9	18.5	86	73.7	44.3	136	116.6	70.0	186	159.4	95.8	236	202.3	121.5	286	245.1	147.3
37	31.7	19.1	87	74.6	44.8	37	117.4	70.6	87	160.3	96.3	37	203.1	122.1	87	246.0	147.8
38	32.6	19.6	88	75.4	45.3	38	118.3	71.1	88	161.1	96.8	38	204.0	122.6	88	246.8	148.3
39	33.4	20.1	89	76.3	45.8	39	119.1	71.6	89	162.0	97.3	39	204.8	123.1	89	247.7	148.8
40	34.3	20.6	90	77.1	46.4	40	120.0	72.1	90	162.8	97.9	40	205.7	123.6	90	248.5	149.4
41	35.1	21.1	91	78.0	46.9	141	120.8	72.6	191	163.7	98.4	241	206.5	124 1	291	249.4	149.9
42	36.0	21.6	92	78.8	47.4	42	121.7	73.1	92	164.5	98.9	42	207.4	124.6	92	250.2	150.4
43	36.9	22.1	93	79.7	47.9	43	122.6	73.6	93	165.4	99.4	43	208.3	125.1	93	251.1	150.9
44	37.7	22.6	94	80.6	48.4	44	123.4	74.2	94	166.3	99.9	44	209.1	125.6	94	252.0	151.4
45	38.6	23.2	95	81.4	48.9	45	124.3	74.7	95	167.1	100.4	45	210.0	126.2	95	252.8	151.9
46	39.4	23.7	96	82.3	49.4	146	125.1	75.2	196	168.0	100.9	246	210.8	126.7	296	253.7	152.4
47	40.3	24.2	97	83.1	50.0	47	126 0	75.7	97	168.8	101.5	47	211.7	127.2	97	254.5	153.0
48	41.1	24.7	98	84.0	50.5	48	126.8	76.2	98	169.7	102.0	48	212.5	127.7	98	255.4	153.5
49	42.0	25.2	99	84.8	51.0	49	127.7	76.7	99	170.5	102.5	49	213.4	128.2	99	256.2	154.0
50	42.9	25.8	100	85.7	51.5	150	128.6	77.3	200	171.4	103.0	250	214.3	128.8	300	257 1	154.5
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.8	00.5	51	43.2	27.0	101	85.6	53.5	151	128.0	80.0	201	170.4	106.5	251	212.8	133.0
2	01.7	01.1	52	44.1	27.6	02	86.5	54.1	52	128.9	80.6	02	171.3	107.1	52	213.7	133.6
3	02.5	01.6	53	44.9	28.1	03	87.3	54.6	53	129.7	81.1	03	172.1	107.6	53	214.5	134.1
4	03.4	02.1	54	45.8	28.6	04	88.2	55.1	54	130.6	81.6	04	173.0	108.1	54	215.4	134.6
5	04.2	02.7	55	46.6	29.2	05	89.0	55.7	55	131.4	82.2	05	173.8	108.7	55	216.2	135.2
6	05.1	03.2	56	47.5	29.7	106	89.9	56.2	156	132.3	82.7	206	174.7	109.2	256	217.1	135.7
7	05.9	03.7	57	48.3	30.2	07	90.7	56.7	57	133.1	83.2	07	175.5	109.7	57	217.9	136.2
8	06.8	04.2	58	49.2	30.7	08	91.6	57.2	58	134.0	83.7	08	176.4	110.2	58	218.8	136.7
9	07.6	04.8	59	50.0	31.3	09	92.4	57.8	59	134.8	84.3	09	177.2	110.8	59	219.6	137.3
10	08.5	05.3	60	50.9	31.8	10	93.3	58.3	60	135.7	84.8	10	178.1	111.3	60	220.5	137.8
11	09.3	05.8	61	51.7	32.3	111	94.1	58.8	161	136.5	85.3	211	178.9	111.8	261	221.3	138.3
12	10.2	06.4	62	52.6	32.9	12	95.0	59.4	62	137.4	85.9	12	179.8	112.4	62	222.2	138.9
13	11.0	06.9	63	53.4	33.4	13	95.8	59.9	63	138.2	86.4	13	180.6	112.9	63	223.0	139.4
14	11.9	07.4	64	54.3	33.9	14	96.7	60.4	64	139.1	86.9	14	181.5	113.4	64	223.9	139.9
15	12.7	08.0	65	55.1	34.5	15	97.5	61.0	65	139.9	87.5	15	182.3	114.0	65	224.7	140.5
16	13.6	08.5	66	56.0	35.0	116	98.4	61.5	166	140.8	88.0	216	183.2	114.5	266	225.6	141.0
17	14.4	09.0	67	56.8	35.5	17	99.2	62.0	67	141.6	88.5	17	184.0	115.0	67	226.4	141.5
18	15.3	09.5	68	57.7	36.0	18	100.1	62.5	68	142.5	89.0	18	184.9	115.5	68	227.3	142.0
19	16.1	10.1	69	58.5	36.6	19	100.9	63.1	69	143.3	89.6	19	185.7	116.1	69	228.1	142.6
20	17.0	10.6	70	59.4	37.1	20	101.8	63.6	70	144.2	90.1	20	186.6	116.6	70	229.0	143.1
21	17.8	11.1	71	60.2	37.6	121	102.6	64.1	171	145.0	90.6	221	187.4	117.1	271	229.8	143.6
22	18.7	11.7	72	61.1	38.2	22	103.5	64.7	72	145.9	91.2	22	188.3	117.7	72	230.7	144.2
23	19.5	12.2	73	61.9	38.7	23	104.3	65.2	73	146.7	91.7	23	189.1	118.2	73	231.5	144.7
24	20.4	12.7	74	62.8	39.2	24	105.2	65.7	74	147.6	92.2	24	190.0	118.7	74	232.4	145.2
25	21.2	13.3	75	63.6	39.8	25	106.0	66.3	75	148.4	92.8	25	190.8	119.3	75	233.2	145.8
26	22.0	13.8	76	64.4	40.3	126	106.8	66.8	176	149.2	93.3	226	191.6	119.8	276	234.0	146.3
27	22.9	14.3	77	65.3	40.8	27	107.7	67.3	77	150.1	93.8	27	192.5	120.3	77	234.9	146.8
28	23.7	14.8	78	66.1	41.3	28	108.5	67.8	78	150.9	94.3	28	193.3	120.8	78	235.7	147.3
29	24.6	15.4	79	67.0	41.9	29	109.4	68.4	79	151.8	94.9	29	194.2	121.4	79	236.6	147.9
30	25.4	15.9	80	67.8	42.4	30	110.2	68.9	80	152 6	95.4	30	195.0	121.9	80	237.4	148.4
31	26.3	16.4	81	68.7	42.9	131	111.1	69.4	181	153.5	95.9	231	195.9	122.4	281	238.3	148.9
32	27.1	17.0	82	69.5	43.5	32	111.9	70.0	82	154.3	96.5	32	196.7	123.0	82	239.1	149.5
33	28.0	17.5	83	70.4	44.0	33	112.8	70.5	83	155.2	97.0	33	197.6	123.5	83	240.0	150.0
34	28.8	18.0	84	71.2	44.5	34	113.6	71.0	84	156.0	97.5	34	198.4	124.0	84	240.8	150.5
35	29.7	18.6	85	72.1	45.1	35	114.5	71.6	85	156.9	98.1	35	199.3	124.6	85	241.7	151.1
36	30.5	19.1	86	72.9	45.6	136	115.3	72.1	186	157.7	98.6	236	200.1	125.1	286	242.5	151.6
37	31.4	19.6	87	73.8	46.1	37	116.2	72.6	87	158.6	99.1	37	201.0	125.6	87	243.4	152.1
38	32.2	20.1	88	74.6	46.6	38	117.0	73.1	88	159.4	99.6	38	201.8	126.1	88	244.2	152.6
39	33.1	20.7	89	75.5	47.2	39	117.9	73.7	89	160.3	100.2	39	202.7	126.7	89	245.1	153.2
40	33.9	21.2	90	76.3	47.7	40	118.7	74.2	90	161.1	100.7	40	203.5	127.2	90	245.9	153.7
41	34.8	21.7	91	77.2	48.2	141	119.6	74.7	191	162.0	101.2	241	204.4	127.7	291	246.8	154.2
42	35.6	22.3	92	78.0	48.8	42	120.4	75.3	92	162.8	101.8	42	205.2	128.3	92	247.6	154.8
43	36.5	22.8	93	78.9	49.3	43	121.3	75.8	93	163.7	102.3	43	206.1	128.8	93	248.5	155.3
44	37.3	23.3	94	79.7	49.8	44	122.1	76.3	94	164.5	102.8	44	206.9	129.3	94	249.3	155.8
45	38.2	23.9	95	80.6	50.4	45	123.0	76.9	95	165.4	103.4	45	207.8	129.9	95	250.2	156.4
46	39.0	24.4	96	81.4	50.9	146	123.8	77.4	196	166.2	103.9	246	208.6	130.4	296	251.0	156.9
47	39.9	24.9	97	82.3	51.4	47	124.7	77.9	97	167.1	104.4	47	209.5	130.9	97	251.9	157.4
48	40.7	25.4	98	83.1	51.9	48	125.5	78.4	98	167.9	104.9	48	210.3	131.4	98	252.7	157.9
49	41.6	26.0	99	84.0	52.5	49	126.4	79.0	99	168.8	105.5	49	211.2	132.0	99	253.6	158.5
50	42.4	26.5	100	84.8	53.0	150	127.2	79.5	200	169.6	106.0	250	212.0	132.5	300	254.4	159.0
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat



Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.8	00.5	51	42.8	27.8	101	84.7	55.0	151	126.6	82.2	201	168.6	109.5	251	210.5	136.7
2	01.7	01.1	52	43.6	28.3	02	85.5	55.5	52	127.5	82.8	02	169.4	110.0	52	211.3	137.2
3	02.5	01.6	53	44.4	28.9	03	86.4	56.1	53	128.3	83.3	03	170.2	110.6	53	212.2	137.8
4	03.4	02.2	54	45.3	29.4	04	87.2	56.6	54	129.1	83.9	04	171.1	111.1	54	213.0	138.3
5	04.2	02.7	55	46.1	30.0	05	88.1	57.2	55	130.0	84.4	05	171.9	111.6	55	213.8	138.9
6	05.0	03.3	56	47.0	30.5	106	88.9	57.7	156	130.8	85.0	206	172.8	112.2	256	214.7	139.4
7	05.9	03.8	57	47.8	31.0	07	89.7	58.3	57	131.7	85.5	07	173.6	112.7	57	215.5	140.0
8	06.7	04.4	58	48.6	31.6	08	90.6	58.8	58	132.5	86.0	08	174.4	113.3	58	216.4	140.5
9	07.5	04.9	59	49.5	32.1	09	91.4	59.4	59	133.3	86.6	09	175.3	113.8	59	217.2	141.1
10	08.4	05.4	60	50.3	32.7	10	92.2	59.9	60	134.2	87.1	10	176.1	114.4	60	218.0	141.6
11	09.2	06.0	61	51.2	33.2	111	93.1	60.5	161	135.0	87.7	211	176.9	114.9	261	218.9	142.1
12	10.1	06.5	62	52.0	33.8	12	93.9	61.0	62	135.9	88.2	12	177.8	115.5	62	219.7	142.7
13	10.9	07.1	63	52.8	34.3	13	94.8	61.5	63	136.7	88.8	13	178.6	116.0	63	220.6	143.2
14	11.7	07.6	64	53.7	34.9	14	95.6	62.1	64	137.5	89.3	14	179.5	116.5	64	221.4	143.8
15	12.6	08.2	65	54.5	35.4	15	96.4	62.6	65	138.4	89.9	15	180.3	117.1	65	222.2	144.3
16	13.4	08.7	66	55.3	35.9	116	97.3	63.2	166	139.2	90.4	216	181.1	117.6	266	223.1	144.9
17	14.3	09.3	67	56.2	36.5	17	98.1	63.7	67	140.0	90.9	17	182.0	118.2	67	223.9	145.4
18	15.1	09.8	68	57.0	37.0	18	99.0	64.3	68	140.9	91.5	18	182.8	118.7	68	224.7	146.0
19	15.9	10.3	69	57.9	37.6	19	99.8	64.8	69	141.7	92.0	19	183.7	119.3	69	225.6	146.5
20	16.8	10.9	70	58.7	38.1	20	100.6	65.4	70	142.6	92.6	20	184.5	119.8	70	226.4	147.0
21	17.6	11.4	71	59.5	38.7	121	101.5	65.9	171	143.4	93.1	221	185.3	120.4	271	227.3	147.6
22	18.4	12.0	72	60.4	39.2	22	102.3	66.4	72	144.2	93.7	22	186.2	120.9	72	228.1	148.1
23	19.3	12.5	73	61.2	39.8	23	103.1	67.0	73	145.1	94.2	23	187.0	121.4	73	228.9	148.7
24	20.1	13.1	74	62.1	40.3	24	104.0	67.5	74	145.9	94.8	24	187.8	122.0	74	229.8	149.2
25	21.0	13.6	75	62.9	40.8	25	104.8	68.1	75	146.8	95.3	25	188.7	122.5	75	230.6	149.8
26	21.8	14.2	76	63.7	41.4	126	105.7	68.6	176	147.6	95.8	226	189.5	123.1	276	231.5	150.3
27	22.6	14.7	77	64.6	41.9	27	106.5	69.2	77	148.4	96.4	27	190.4	123.6	77	232.3	150.9
28	23.5	15.2	78	65.4	42.5	28	107.3	69.7	78	149.3	96.9	28	191.2	124.2	78	233.1	151.4
29	24.3	15.8	79	66.2	43.0	29	108.2	70.3	79	150.1	97.5	29	192.0	124.7	79	234.0	151.9
30	25.2	16.3	80	67.1	43.6	30	109.0	70.8	80	150.9	98.0	30	192.9	125.3	80	234.8	152.5
31	26.0	16.9	81	67.9	44.1	131	109.9	71.3	181	151.8	98.6	231	193.7	125.8	281	235.6	153.0
32	26.8	17.4	82	68.8	44.7	32	110.7	71.9	82	152.6	99.1	32	194.6	126.3	82	236.5	153.6
33	27.7	18.0	83	69.6	45.2	33	111.5	72.4	83	153.5	99.7	33	195.4	126.9	83	237.3	154.1
34	28.5	18.5	84	70.4	45.7	34	112.4	73.0	84	154.3	100.2	34	196.2	127.4	84	238.2	154.7
35	29.4	19.1	85	71.3	46.3	35	113.2	73.5	85	155.1	100.8	35	197.1	128.0	85	239.0	155.2
36	30.2	19.6	86	72.1	46.8	136	114.0	74.1	186	156.0	101.3	236	197.9	128.5	286	239.8	155.8
37	31.0	20.2	87	73.0	47.4	37	114.9	74.6	87	156.8	101.8	37	198.7	129.1	87	240.7	156.3
38	31.9	20.7	88	73.8	47.9	38	115.7	75.2	88	157.7	102.4	38	199.6	129.6	88	241.5	156.8
39	32.7	21.2	89	74.6	48.5	39	116.6	75.7	89	158.5	102.9	39	200.4	130.2	89	242.4	157.4
40	33.5	21.8	90	75.5	49.0	40	117.4	76.2	90	159.3	103.5	40	201.3	130.7	90	243.2	157.9
41	34.4	22.3	91	76.3	49.6	141	118.2	76.8	191	160.2	104.0	241	202.1	131.2	291	244.0	158.5
42	35.2	22.9	92	77.2	50.1	42	119.1	77.3	92	161.0	104.6	42	202.9	131.8	92	244.9	159.0
43	36.1	23.4	93	78.0	50.6	43	119.9	77.9	93	161.8	105.1	43	203.8	132.3	93	245.7	159.6
44	36.9	24.0	94	78.8	51.2	44	120.8	78.4	94	162.7	105.7	44	204.6	132.9	94	246.5	160.1
45	37.7	24.5	95	79.7	51.7	45	121.6	79.0	95	163.5	106.2	45	205.5	133.4	95	247.4	160.7
46	38.6	25.1	96	80.5	52.3	146	122.4	79.5	196	164.4	106.7	246	206.3	134.0	296	248.2	161.2
47	39.4	25.6	97	81.3	52.8	47	123.3	80.1	97	165.2	107.3	47	207.1	134.5	97	249.1	161.7
48	40.3	26.1	98	82.2	53.4	48	124.1	80.6	98	166.0	107.8	48	208.0	135.1	98	249.9	162.3
49	41.1	26.7	99	83.0	53.9	49	125.0	81.1	99	166.9	108.4	49	208.8	135.6	99	250.7	162.8
50	41.9	27.2	100	83.9	54.5	150	125.8	81.7	200	167.7	108.9	250	209.7	136.2	300	251.6	163.4
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.8	00.6	51	42.3	28.5	101	83.7	56.5	151	125.2	84.4	201	166.6	112.5	251	208.1	140.4
2	01.7	01.1	52	43.1	29.1	02	84.6	57.0	52	126.0	85.0	02	167.5	113.0	52	208.9	140.9
3	02.5	01.7	53	43.9	29.6	03	85.4	57.6	53	126.8	85.6	03	168.3	113.5	53	209.7	141.5
4	03.3	02.2	54	44.8	30.2	04	86.2	58.2	54	127.7	86.1	04	169.1	114.1	54	210.6	142.0
5	04.1	02.8	55	45.6	30.8	05	87.0	58.7	55	128.5	86.7	05	169.9	114.6	55	211.4	142.6
6	05.0	03.4	56	46.4	31.3	106	87.9	59.3	156	129.3	87.2	206	170.8	115.2	256	212.2	143.2
7	05.8	03.9	57	47.3	31.9	07	88.7	59.8	57	130.2	87.8	07	171.6	115.8	57	213.1	143.7
8	06.6	04.5	58	48.1	32.4	08	89.5	60.4	58	131.0	88.4	08	172.4	116.3	58	213.9	144.3
9	07.5	05.0	59	48.9	33.0	09	90.4	61.0	59	131.8	88.9	09	173.3	116.9	59	214.7	144.8
10	08.3	05.6	60	49.7	33.6	10	91.2	61.5	60	132.6	89.5	10	174.1	117.4	60	215.5	145.4
11	09.1	06.2	61	50.6	34.1	111	92.0	62.1	161	133.5	90.0	211	174.9	118.0	261	216.4	146.0
12	09.9	06.7	62	51.4	34.7	12	92.8	62.6	62	134.3	90.6	12	175.7	118.6	62	217.2	146.5
13	10.8	07.3	63	52.2	35.2	13	93.7	63.2	63	135.1	91.1	13	176.6	119.1	63	218.0	147.1
14	11.6	07.8	64	53.1	35.8	14	94.5	63.7	64	136.0	91.7	14	177.4	119.7	64	218.9	147.6
15	12.4	08.4	65	53.9	36.3	15	95.3	64.3	65	136.8	92.3	15	178.2	120.2	65	219.7	148.2
16	13.3	08.9	66	54.7	36.9	116	96.2	64.9	166	137.6	92.8	216	179.1	120.8	266	220.5	148.7
17	14.1	09.5	67	55.5	37.5	17	97.0	65.4	67	138.4	93.4	17	179.9	121.3	67	221.3	149.3
18	14.9	10.1	68	56.4	38.0	18	97.8	66.0	68	139.3	93.9	18	180.7	121.9	68	222.2	149.9
19	15.8	10.6	69	57.2	38.6	19	98.7	66.5	69	140.1	94.5	19	181.6	122.5	69	223.0	150.4
20	16.6	11.2	70	58.0	39.1	20	99.5	67.1	70	140.9	95.1	20	182.4	123.0	70	223.8	151.0
21	17.4	11.7	71	58.9	39.7	121	100.3	67.7	171	141.8	95.6	221	183.2	123.6	271	224.7	151.5
22	18.2	12.3	72	59.7	40.3	22	101.1	68.2	72	142.6	96.2	22	184.0	124.1	72	225.5	152.1
23	19.1	12.9	73	60.5	40.8	23	102.0	68.8	73	143.4	96.7	23	184.9	124.7	73	226.3	152.7
24	19.9	13.4	74	61.3	41.4	24	102.8	69.3	74	144.2	97.3	24	185.7	125.3	74	227.1	153.2
25	20.7	14.0	75	62.2	41.9	25	103.6	69.9	75	145.1	97.9	25	186.5	125.8	75	228.0	153.8
26	21.6	14.5	76	63.0	42.5	126	104.5	70.5	176	145.9	98.4	226	187.4	126.4	276	228.8	154.3
27	22.4	15.1	77	63.8	43.1	27	105.3	71.0	77	146.7	99.0	27	188.2	126.9	77	229.6	154.9
28	23.2	15.7	78	64.7	43.6	28	106.1	71.6	78	147.6	99.5	28	189.0	127.5	78	230.5	155.5
29	24.0	16.2	79	65.5	44.2	29	106.9	72.1	79	148.4	100.1	29	189.8	128.1	79	231.3	156.0
30	24.9	16.8	80	66.3	44.7	30	107.8	72.7	80	149.2	100.7	30	190.7	128.6	80	232.1	156.6
31	25.7	17.3	81	67.1	45.3	131	108.6	73.3	181	150.0	101.2	231	191.5	129.2	281	232.9	157.1
32	26.5	17.9	82	68.0	45.9	32	109.4	73.8	82	150.9	101.8	32	192.3	129.7	82	233.8	157.7
33	27.4	18.5	83	68.8	46.4	33	110.3	74.4	83	151.7	102.3	33	193.2	130.3	83	234.6	158.3
34	28.2	19.0	84	69.6	47.0	34	111.1	74.9	84	152.5	102.9	34	194.0	130.9	84	235.4	158.8
35	29.0	19.6	85	70.5	47.5	35	111.9	75.5	85	153.4	103.5	35	194.8	131.4	85	236.3	159.4
36	29.8	20.1	86	71.3	48.1	136	112.7	76.1	186	154.2	104.0	236	195.6	132.0	286	237.1	159.9
37	30.7	20.7	87	72.1	48.7	37	113.6	76.6	87	155.0	104.6	37	196.5	132.5	87	237.9	160.5
38	31.5	21.2	88	73.0	49.2	38	114.4	77.2	88	155.9	105.1	38	197.3	133.1	88	238.8	161.0
39	32.3	21.8	89	73.8	49.8	39	115.2	77.7	89	156.7	105.7	39	198.1	133.6	89	239.6	161.6
40	33.2	22.4	90	74.6	50.3	40	116.1	78.3	90	157.5	106.2	40	199.0	134.2	90	240.4	162.2
41	34.0	22.9	91	75.4	50.9	141	116.9	78.8	191	158.3	106.8	241	199.8	134.8	291	241.2	162.7
42	34.8	23.5	92	76.3	51.4	42	117.7	79.4	92	159.2	107.4	42	200.6	135.3	92	242.1	163.3
43	35.6	24.0	93	77.1	52.0	43	118.5	80.0	93	160.0	107.9	43	201.4	135.9	93	242.9	163.8
44	36.5	24.6	94	77.9	52.6	44	119.4	80.5	94	160.8	108.5	44	202.3	136.4	94	243.7	164.4
45	37.3	25.2	95	78.8	53.1	45	120.2	81.1	95	161.7	109.0	45	203.1	137.0	95	244.6	165.0
46	38.1	25.7	96	79.6	53.7	146	121.0	81.6	196	162.5	109.6	246	203.9	137.6	296	245.4	165.5
47	39.0	26.3	97	80.4	54.2	47	121.9	82.2	97	163.3	110.2	47	204.8	138.1	97	246.2	166.1
48	39.8	26.8	98	81.2	54.8	48	122.7	82.8	98	164.1	110.7	48	205.6	138.7	98	247.0	166.6
49	40.6	27.4	99	82.1	55.4	49	123.5	83.3	99	165.0	111.3	49	206.4	139.2	99	247.9	167.2
50	41.5	28.0	100	82.9	55.9	150	124.4	83.9	200	165.8	111.8	250	207.3	139.8	300	248.7	167.8
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.8	00.6	51	41.8	29.2	101	82.7	57.9	151	123.7	86.6	201	164.6	115.3	251	205.6	143.9
2	01.6	01.1	52	42.6	29.8	02	83.5	58.5	52	124.5	87.2	02	165.4	115.8	52	206.4	144.5
3	02.5	01.7	53	43.4	30.4	03	84.4	59.1	53	125.3	87.7	03	166.3	116.4	53	207.2	145.1
4	03.3	02.3	54	44.2	31.0	04	85.2	59.6	54	126.1	88.3	04	167.1	117.0	54	208.0	145.7
5	04.1	02.9	55	45.0	31.5	05	86.0	60.2	55	126.9	88.9	05	167 9	117.6	55	208.8	146.2
6	04.9	03.4	56	45.9	32.1	106	86.8	60.8	156	127.8	89.5	206	168.7	118.1	256	209.6	146.8
7	05.7	04.0	57	46.7	32.7	07	87.6	61.4	57	128.6	90.0	07	169.5	118.7	57	210.5	147.4
8	06.6	04.6	58	47.5	33.3	08	88.5	61.9	58	129.4	90.6	08	170.3	119.3	58	211.3	148.0
9	07.4	05.2	59	48.3	33.8	09	89.3	62.5	59	130.2	91.2	09	171.2	119.9	59	212.1	148.5
10	08.2	05.7	60	49.1	34.4	10	90.1	63.1	60	131.0	91.8	10	172.0	120.4	60	212.9	149.1
11	09.0	06.3	61	50.0	35.0	111	90.9	63 7	161	131.9	92.3	211	172.8	121.0	261	213.8	149.7
12	09.8	06.9	62	50.8	35.6	12	91.7	64.2	62	132.7	92 9	12	173.6	121.6	62	214.6	150.3
13	10.6	07.5	63	51.6	36.1	13	92.5	64.8	63	133.5	93.5	13	174.4	122.2	63	215.4	150.8
14	11.5	08.0	64	52.4	36.7	14	93.4	65.4	64	134.3	94.1	14	175.3	122.7	64	216.2	151.4
15	12.3	08.6	65	53.2	37.3	15	94.2	66.0	65	135.1	94.6	15	176.1	123.3	65	217.0	152.0
16	13.1	09.2	66	54.1	37.9	116	95.0	66.5	166	136.0	95.2	216	176.9	123.9	266	217.8	152.6
17	13.9	09.7	67	54.9	38.4	17	95.8	67.1	67	136.8	95.8	17	177.7	124.4	67	218.7	153.1
18	14.7	10.3	68	55.7	39.0	18	96.6	67.7	68	137.6	96.3	18	178.5	125.0	68	219.5	153.7
19	15.6	10.9	69	56.5	39.6	19	97.5	68.2	69	138.4	96.9	19	179.4	125.6	69	220.3	154.3
20	16.4	11.5	70	57.3	40.1	20	98.3	68.8	70	139.2	97.5	20	180.2	126.2	70	221.1	154.8
21	17.2	12.0	71	58.1	40.7	121	99.1	69.4	171	140.0	98.1	221	181.0	126.7	271	221.9	155.4
22	18.0	12.6	72	59.0	41.3	22	99.9	70.0	72	140.9	98.6	22	181.8	127.3	72	222.8	156.0
23	18.8	13.2	73	59.8	41.9	23	100.7	70.5	73	141.7	99.2	23	182.6	127.9	73	223.6	156.6
24	19.6	13.8	74	60.6	42.4	24	101.6	71.1	74	142.5	99.8	24	183.5	128.5	74	224.4	157.1
25	20.5	14.3	75	61.4	43.0	25	102.4	71.7	75	143.3	100.4	25	184.3	129.0	75	225.2	157.7
26	21.3	14.9	76	62.2	43.6	126	103.2	72.3	176	144.1	100.9	226	185.1	129.6	276	226.0	158.3
27	22.1	15.5	77	63.1	44.2	27	104.0	72.8	77	145.0	101.5	27	185.9	130.2	77	226.9	158.9
28	22.9	16.1	78	63.9	44.7	28	104.8	73.4	78	145.8	102.1	28	186.7	130.8	78	227.7	159.4
29	23.8	16.6	79	64.7	45.3	29	105.6	74.0	79	146.6	102.7	29	187.5	131.3	79	228.5	160.0
30	24.6	17.2	80	65.5	45.9	30	106.5	74.6	80	147.4	103.2	30	188.4	131.9	80	229.3	160.6
31	25.4	17.8	81	66.3	46.5	131	107.3	75.1	181	148.2	103.8	231	189.2	132.5	281	230.1	161.2
32	26.2	18.4	82	67.2	47.0	32	108.1	75.7	82	149.1	104.4	32	190.0	133.1	82	231.0	161.7
33	27.0	18.9	83	68.0	47.6	33	108.9	76.3	83	149.9	105.0	33	190.8	133.6	83	231.8	162.3
34	27.8	19.5	84	68.8	48.2	34	109.7	77.8	84	150.7	105.5	34	191.6	134.2	84	232.6	162.9
35	28.7	20.1	85	69.6	48.7	35	110.6	77.4	85	151.5	106.1	35	192.5	134.8	85	233.4	163.4
36	29.5	20.6	86	70.4	49.3	136	111.4	78.0	186	152.3	106.7	236	193.3	135.3	286	234.2	164.0
37	30.3	21.2	87	71.3	49.9	37	112.2	78.6	87	153.1	107.2	37	194.1	135.9	87	235.0	164.6
38	31.1	21.8	88	72.1	50.5	38	113.0	79.1	88	154.0	107.8	38	194.9	136.5	88	235.9	165.2
39	31.9	22.4	89	72.9	51.0	39	113.8	79.7	89	154.8	108.4	39	195.7	137.1	89	236.7	165.7
40	32.8	22.9	90	73.7	51.6	40	114.6	80.3	90	155.6	109.0	40	196.6	137.6	90	237.5	166.3
41	33.6	23.5	91	74.5	52.2	141	115.5	80.9	191	156.4	109.5	241	197.4	138.2	291	238.3	166.9
42	34.4	24.1	92	75.3	52.8	42	116.3	81.4	92	157.2	110.1	42	198.2	138.8	92	239.1	167.5
43	35.2	24.7	93	76.2	53.3	43	117.1	82.0	93	158.1	110.7	43	199.0	139.4	93	240.0	168.0
44	36.0	25.2	94	77.0	53.9	44	117.9	82.6	94	158.9	111.3	44	199.8	139.9	94	240.8	168.6
45	36.9	25.8	95	77.8	54.5	45	118.8	83.2	95	159.7	111.8	45	200.6	140.5	95	241.6	169.2
46	37.7	26.4	96	78.6	55.1	146	119.6	83.7	196	160.5	112.4	246	201.5	141.1	296	242.4	169.8
47	38.5	27.0	97	79.4	55.6	47	120.4	84.3	97	161.3	113.0	47	202.3	141.7	97	243.2	170.3
48	39.3	27.5	98	80.3	56.2	48	121.2	84.9	98	162.2	113.6	48	203.1	142.2	98	244.1	170.9
49	40.1	28.1	99	81.1	56.8	49	122.0	85.5	99	163.0	114.1	49	203.9	142.8	99	244.9	171.5
50	41.0	28.7	100	81.9	57.4	150	122.8	86.0	200	163.8	114.7	250	204.7	143.4	300	245.7	172.1
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

for 55 Deg.

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.8	00.6	51	41.3	30.0	101	81.7	59.4	151	122.2	88.8	201	162.6	118.1	251	203.1	147.5
2	01.6	01.2	52	42.1	30.6	02	82.5	60.0	52	123.0	89.3	02	163.4	118.7	52	203.9	148.1
3	02.4	01.8	53	42.9	31.2	03	83.3	60.5	53	123.8	89.9	03	164.2	119.3	53	204.7	148.7
4	03.2	02.4	54	43.7	31.7	04	84.1	61.1	54	124.6	90.5	04	165.0	119.9	54	205.5	149.3
5	04.0	02.9	55	44.5	32.3	05	84.9	61.7	55	125.4	91.1	05	165.8	120.5	55	206.3	149.9
6	04.9	03.5	56	45.3	32.9	106	85.8	62.3	156	126.2	91.7	206	166.7	121.1	256	207.1	150.5
7	05.7	04.1	57	46.1	33.5	07	86.6	62.9	57	127.0	92.3	07	167.5	121.7	57	207.9	151.1
8	06.5	04.7	58	46.9	34.1	08	87.4	63.5	58	127.8	92.9	08	168.3	122.3	58	208.7	151.7
9	07.3	05.3	59	47.7	34.7	09	88.2	64.1	59	128.6	93.5	09	169.1	122.8	59	209.5	152.2
10	08.1	05.9	60	48.5	35.3	10	89.0	64.7	60	129.4	94.0	10	169.9	123.4	60	210.3	152.8
11	08.9	06.5	61	49.3	35.9	111	89.8	65.2	161	130.2	94.6	211	170.7	124.0	261	211.1	153.4
12	09.7	07.1	62	50.2	36.4	12	90.6	65.8	62	131.1	95.2	12	171.5	124.6	62	212.0	154.0
13	10.5	07.6	63	51.0	37.0	13	91.4	66.4	63	131.9	95.8	13	172.3	125.2	63	212.8	154.6
14	11.3	08.2	64	51.8	37.6	14	92.2	67.0	64	132.7	96.4	14	173.1	125.8	64	213.6	155.2
15	12.1	08.8	65	52.6	38.2	15	93.0	67.6	65	133.5	97.0	15	173.9	126.4	65	214.4	155.8
16	12.9	09.4	66	53.4	38.8	116	93.8	68.2	166	134.3	97.6	216	174.7	127.0	266	215.2	156.4
17	13.8	10.0	67	54.2	39.4	17	94.7	68.8	67	135.1	98.2	17	175.6	127.6	67	216.0	156.9
18	14.6	10.6	68	55.0	40.0	18	95.5	69.4	68	135.9	98.7	18	176.4	128.1	68	216.8	157.5
19	15.4	11.2	69	55.8	40.6	19	96.3	69.9	69	136.7	99.3	19	177.2	128.7	69	217.6	158.1
20	16.2	11.8	70	56.6	41.1	20	97.1	70.5	70	137.5	99.9	20	178.0	129.3	70	218.4	158.7
21	17.0	12.3	71	57.4	41.7	121	97.9	71.1	171	138.3	100.5	221	178.8	129.9	271	219.2	159.3
22	17.8	12.9	72	58.2	42.3	22	98.7	71.7	72	139.1	101.1	22	179.6	130.5	72	220.0	159.9
23	18.6	13.5	73	59.1	42.9	23	99.5	72.3	73	140.0	101.7	23	180.4	131.1	73	220.9	160.5
24	19.4	14.1	74	59.9	43.5	24	100.3	72.9	74	140.8	102.3	24	181.2	131.7	74	221.7	161.1
25	20.2	14.7	75	60.7	44.1	25	101.1	73.5	75	141.6	102.9	25	182.0	132.3	75	222.5	161.6
26	21.0	15.3	76	61.5	44.7	126	101.9	74.1	176	142.4	103.5	226	182.8	132.8	276	223.3	162.2
27	21.8	15.9	77	62.3	45.3	27	102.7	74.7	77	143.2	104.0	27	183.6	133.4	77	224.1	162.8
28	22.7	16.5	78	63.1	45.8	28	103.6	75.2	78	144.0	104.6	28	184.5	134.0	78	224.9	163.4
29	23.5	17.0	79	63.9	46.4	29	104.4	75.8	79	144.8	105.2	29	185.3	134.6	79	225.7	164.0
30	24.3	17.6	80	64.7	47.0	30	105.2	76.4	80	145.6	105.8	30	186.1	135.2	80	226.5	164.6
31	25.1	18.2	81	65.5	47.6	131	106.0	77.0	181	146.4	106.4	231	186.9	135.8	281	227.3	165.2
32	25.9	18.8	82	66.3	48.2	32	106.8	77.6	82	147.2	107.0	32	187.7	136.4	82	228.1	165.8
33	26.7	19.4	83	67.1	48.8	33	107.6	78.2	83	148.0	107.6	33	188.5	137.0	83	228.9	166.3
34	27.5	20.0	84	68.0	49.4	34	108.4	78.8	84	148.9	108.2	34	189.3	137.5	84	229.8	166.9
35	28.3	20.6	85	68.8	50.0	35	109.2	79.4	85	149.7	108.7	35	190.1	138.1	85	230.6	167.5
36	29.1	21.2	86	69.6	50.6	136	110.0	79.9	186	150.5	109.3	236	190.9	138.7	286	231.4	168.1
37	29.9	21.7	87	70.4	51.1	37	110.8	80.5	87	151.3	109.9	37	191.7	139.3	87	232.2	168.7
38	30.7	22.3	88	71.2	51.7	38	111.6	81.1	88	152.1	110.5	38	192.5	139.9	88	233.0	169.3
39	31.6	22.9	89	72.0	52.3	39	112.5	81.7	89	152.9	111.1	39	193.3	140.5	89	233.8	169.9
40	32.4	23.5	90	72.8	52.9	40	113.3	82.3	90	153.7	111.7	40	194.2	141.1	90	234.6	170.5
41	33.2	24.1	91	73.6	53.5	141	114.1	82.9	191	154.5	112.3	241	195.0	141.7	291	235.4	171.0
42	34.0	24.7	92	74.4	54.1	42	114.9	83.5	92	155.3	112.9	42	195.8	142.2	92	236.2	171.6
43	34.8	25.3	93	75.2	54.7	43	115.7	84.1	93	156.1	113.4	43	196.6	142.8	93	237.0	172.2
44	35.6	25.9	94	76.0	55.3	44	116.5	84.6	94	156.9	114.0	44	197.4	143.4	94	237.8	172.8
45	36.4	26.5	95	76.9	55.8	45	117.3	85.2	95	157.8	114.6	45	198.2	144.0	95	238.7	173.4
46	37.2	27.0	96	77.7	56.4	146	118.1	85.8	196	158.6	115.2	246	199.0	144.6	296	239.5	174.0
47	38.0	27.6	97	78.5	57.0	47	118.9	86.4	97	159.4	115.8	47	199.8	145.2	97	240.3	174.6
48	38.8	28.2	98	79.3	57.6	48	119.7	87.0	98	160.2	116.4	48	200.6	145.8	98	241.1	175.2
49	39.6	28.8	99	80.1	58.2	49	120.5	87.6	99	161.0	117.0	49	201.4	146.4	99	241.9	175.7
50	40.5	29.4	100	80.9	58.8	150	121.3	88.2	200	161.8	117.6	250	202.2	146.9	300	242.7	176.3
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.8	00.6	51	40.7	30.7	101	80.7	60.8	151	120.6	90.9	201	160.5	121.0	251	200.4	151.0
2	01.6	01.2	52	41.5	31.3	02	81.5	61.4	52	121.4	91.5	02	161.3	121.6	52	201.2	151.6
3	02.4	01.8	53	42.3	31.9	03	82.3	62.0	53	122.2	92.1	03	162.1	122.2	53	202.0	152.2
4	03.2	02.4	54	43.1	32.5	04	83.1	62.6	54	123.0	92.7	04	162.9	122.8	54	202.8	152.9
5	04.0	03.0	55	43.9	33.1	05	83.9	63.2	55	123.8	93.3	05	163.7	123.4	55	203.6	153.5
6	04.8	03.6	56	44.7	33.7	106	84.7	63.8	156	124.6	93.9	206	164.5	124.0	256	204.4	154.1
7	05.6	04.2	57	45.5	34.3	07	85.5	64.4	57	125.4	94.5	07	165.3	124.6	57	205.2	154.7
8	06.4	04.8	58	46.3	34.9	08	86.2	65.0	58	126.2	95.1	08	166.1	125.2	58	206.0	155.3
9	07.2	05.4	59	47.1	35.5	09	87.0	65.6	59	127.0	95.7	09	166.9	125.8	59	206.8	155.9
10	08.0	06.0	60	47.9	36.1	10	87.8	66.2	60	127.8	96.3	10	167.7	126.4	60	207.6	156.5
11	08.8	06.6	61	48.7	36.7	111	88.6	66.8	161	128.6	96.9	211	168.5	127.0	261	208.4	157.1
12	09.6	07.2	62	49.5	37.3	12	89.4	67.4	62	129.4	97.5	12	169.3	127.6	62	209.2	157.7
13	10.4	07.8	63	50.3	37.9	13	90.2	68.0	63	130.2	98.1	13	170.1	128.2	63	210.0	158.3
14	11.2	08.4	64	51.1	38.5	14	91.0	68.6	64	131.0	98.7	14	170.9	128.8	64	210.8	158.9
15	12.0	09.0	65	51.9	39.1	15	91.8	69.2	65	131.8	99.3	15	171.7	129.4	65	211.6	159.5
16	12.8	09.6	66	52.7	39.7	116	92.6	69.8	166	132 6	99.9	216	172.5	130.0	266	212.4	160.1
17	13.6	10.2	67	53.5	40.3	17	93.4	70.4	67	133.4	100.5	17	173.3	130.6	67	213.2	160.7
18	14.4	10.8	68	54.3	40.9	18	94.2	71.0	68	134.2	101.1	18	174.1	131.2	68	214 0	161.3
19	15.2	11.4	69	55.1	41.5	19	95.0	71.6	69	135.0	101.7	19	174.9	131.8	69	214.8	161.9
20	16.0	12.0	70	55.9	42.1	20	95.8	72.2	70	135.8	102.3	20	175.7	132.4	70	215.6	162.5
21	16.8	12.6	71	56.7	42.7	121	96.6	72.8	171	136.6	102.9	221	176.5	133.0	271	216.4	163.1
22	17.6	13.2	72	57.5	43.3	22	97.4	73.4	72	137.4	103.5	22	177.3	133.6	72	217.2	163.7
23	18.4	13.8	73	58.3	43.9	23	98.2	74.0	73	138.2	104.1	23	178.1	134 2	73	218.0	164.3
24	19.2	14.4	74	59.1	44.5	24	99.0	74.6	74	139.0	104.7	24	178.9	134.8	74	218.8	164.9
25	20.0	15.0	75	59.9	45.1	25	99.8	75.2	75	139.8	105.3	25	179.7	135.4	75	219.6	165.5
26	20.8	15.6	76	60,7	45.7	126	100.6	75.8	176	140.6	105.9	226	180.5	136.0	276	220.4	166.1
27	21.6	16.2	77	61.5	46.3	27	101.4	76.4	77	141.4	106.5	27	181.3	136.6	77	221.2	166.7
28	22.4	16.9	78	62.3	46.9	28	102.2	77.0	78	142.2	107.1	28	182.1	137.2	78	222.0	167.3
29	23.2	17.5	79	63.1	47.5	29	103.0	77.6	79	142.9	107.7	29	182.9	137.8	79	222.8	167.9
30	24.0	18.1	80	63.9	48.1	30	103.8	78.2	80	143.7	108.3	30	183.7	138.4	80	223.6	168.5
31	24.8	18.7	81	64.7	48.7	131	104.6	78.8	181	144.5	108.9	231	184.5	139.0	281	224.4	169.1
32	25.6	19.3	82	65.5	49.3	32	105.4	79.4	82	145.3	109.5	32	185.3	139.6	82	225.2	169.7
33	26.4	19.9	83	66.3	49.9	33	106.2	80.0	83	146.1	110.1	33	186.1	140.2	83	226.0	170.3
34	27.2	20.5	84	67.1	50.6	34	107.0	80.6	84	146.9	110.7	34	186.9	140.8	84	226.8	170.9
35	28.0	21.1	85	67.9	51.2	35	107.8	81.2	85	147.7	111.3	35	187.7	141.4	85	227.6	171.5
36	28.7	21.7	86	68.7	51.8	136	108.6	81.8	186	148.5	111.9	236	188.5	142.0	286	228.4	172.1
37	29.5	22.3	87	69.5	52.4	37	109.4	82.4	87	149.3	112.5	37	189.3	142.6	87	229.2	172.7
38	30.3	22.9	88	70.3	53.0	38	110.2	83.0	88	150.1	113.1	38	190.1	143.2	88	230.0	173.3
39	31.1	23.5	89	71.1	53.6	39	111.0	83.6	89	150.9	113.7	39	190.9	143.8	89	230.8	173.9
40	31.9	24.1	90	71.9	54.2	40	111.8	84.2	90	151.7	114.3	40	191.7	144.4	90	231.6	174.5
41	32.7	24.7	91	72.7	54.8	141	112.6	84.9	191	152.5	114.9	241	192.5	145.0	291	232.4	175.1
42	33.5	25.3	92	73.5	55.4	42	113.4	85.5	92	153.3	115.5	42	193.3	145.6	92	233.2	175.7
43	34.3	25.9	93	74.3	56.0	43	114.2	86.1	93	154.1	116.1	43	194.1	146.2	93	234.0	176.3
44	35.1	26.5	94	75.1	56.6	44	115.0	86.7	94	154.9	116.7	44	194.9	146.8	94	234.8	176.9
45	35.9	27.1	95	75.9	57.2	45	115.8	87.3	95	155.7	117.3	45	195.7	147.4	95	235.6	177.5
46	36.7	27.7	96	76.7	57.8	146	116.6	87.9	196	156.5	117.9	246	196.5	148.0	296	236.4	178.1
47	37.5	28.3	97	77.5	58.4	47	117.4	88.5	97	157.3	118.6	47	197.3	148.6	97	237.2	178.7
48	38.3	28.9	98	78.3	59.0	48	118.2	89.1	98	158.1	119.2	48	198.1	149.2	98	238.0	179.3
49	39.1	29.5	99	79.1	59.6	49	119.0	89.7	99	158.9	119.8	49	198.9	149.8	99	238.8	179.9
50	39.9	30.1	100	79.9	60.2	150	119.8	90.3	200	159.7	120.4	250	199.7	150.4	300	239.6	180.5
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	De.	Lat	Dist	Dep	Lat

Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep
1	00.8	00.6	51	40.2	31.4	101	79.6	62.2	151	119.0	93.0	201	158.4	123.8	251	197.8	154.5
2	01.6	01.2	52	41.0	32.0	02	80.4	62.8	52	119.8	93.6	02	159.2	124.4	52	198.5	155.2
3	02.4	01.8	53	41.8	32.6	03	81.2	63.4	53	120.5	94.2	03	159.9	125.0	53	199.3	155.8
4	03.2	02.5	54	42.5	33.2	04	81.9	64.0	54	121.3	94.8	04	160.7	125.6	54	200.1	156.4
5	03.9	03.1	55	43.3	33.9	05	82.7	64.6	55	122.1	95.4	05	161.5	126.2	55	200.9	157.0
6	04.7	03.7	56	44.1	34.5	106	83.5	65.3	156	122.9	96.0	206	162.3	126.8	256	201.7	157.6
7	05.5	04.3	57	44.9	35.1	07	84.3	65.9	57	123.7	96.7	07	163.1	127.4	57	202.5	158.2
8	06.3	04.9	58	45.7	35.7	08	85.1	66.5	58	124.5	97.3	08	163.9	128.1	58	203.3	158.9
9	07.1	05.5	59	46.5	36.3	09	85.9	67.1	59	125.3	97.9	09	164.7	128.7	59	204.1	159.5
10	07.9	06.2	60	47.3	36.9	10	86.7	67.7	60	126.1	98.5	10	165.5	129.3	60	204.9	160.1
11	08.7	06.8	61	48.1	37.6	111	87.5	68.3	161	126.9	99.1	211	166.2	129.9	261	205.6	160.7
12	09.5	07.4	62	48.9	38.2	12	88.2	69.0	62	127.6	99.7	12	167.0	130.5	62	206.4	161.3
13	10.2	08.0	63	49.6	38.8	13	89.0	69.6	63	128.4	100.4	13	167.8	131.1	63	207.2	161.9
14	11.0	08.6	64	50.4	39.4	14	89.8	70.2	64	129.2	101.0	14	168.6	131.8	64	208.0	162.5
15	11.8	09.2	65	51.2	40.0	15	90.6	70.8	65	130.0	101.6	15	169.4	132.4	65	208.8	163.2
16	12.6	09.9	66	52.0	40.6	116	91.4	71.4	166	130.8	102.2	216	170.2	133.0	266	209.6	163.8
17	13.4	10.5	67	52.8	41.3	17	92.2	72.0	67	131.6	102.8	17	171.0	133.6	67	210.4	164.4
18	14.2	11.1	68	53.6	41.9	18	93.0	72.7	68	132.4	103.4	18	171.8	134.2	68	211.2	165.0
19	15.0	11.7	69	54.4	42.5	19	93.8	73.3	69	133.2	104.1	19	172.5	134.8	69	211.9	165.6
20	15.8	12.3	70	55.2	43.1	20	94.5	73.9	70	133.9	104.7	20	173.3	135.5	70	212.7	166.2
21	16.5	12.9	71	55.9	43.7	121	95.3	74.5	171	134.7	105.3	221	174.1	136.1	271	213.5	166.9
22	17.3	13.5	72	56.7	44.3	22	96.1	75.1	72	135.5	105.9	22	174.9	136.7	72	214.3	167.5
23	18.1	14.2	73	57.5	44.9	23	96.9	75.7	73	136.3	106.5	23	175.7	137.3	73	215.1	168.1
24	18.9	14.8	74	58.3	45.6	24	97.7	76.3	74	137.1	107.1	24	176.5	137.9	74	215.9	168.7
25	19.7	15.4	75	59.1	46.2	25	98.5	77.0	75	137.9	107.7	25	177.3	138.5	75	216.7	169.3
26	20.5	16.0	76	59.9	46.8	126	99.3	77.6	176	138.7	108.4	226	178.1	139.1	276	217.5	169.9
27	21.3	16.6	77	60.7	47.4	27	100.1	78.2	77	139.5	109.0	27	178.9	139.8	77	218.2	170.5
28	22.1	17.2	78	61.5	48.0	28	100.9	78.8	78	140.2	109.6	28	179.6	140.4	78	219.0	171.2
29	22.9	17.9	79	62.2	48.6	29	101.6	79.4	79	141.0	110.2	29	180.4	141.0	79	219.8	171.8
30	23.6	18.5	80	63.0	49.3	30	102.4	80.0	80	141.8	110.8	30	181.2	141.6	80	220.6	172.4
31	24.4	19.1	81	63.8	49.9	131	103.2	80.7	181	142.6	111.4	231	182.0	142.2	281	221.4	173.0
32	25.2	19.7	82	64.6	50.5	32	104.0	81.3	82	143.4	112.1	32	182.8	142.8	82	222.2	173.6
33	26.0	20.3	83	65.4	51.1	33	104.8	81.9	83	144.2	112.7	33	183.6	143.5	83	223.0	174.2
34	26.8	20.9	84	66.2	51.7	34	105.6	82.5	84	145.0	113.3	34	184.4	144.1	84	223.8	174.9
35	27.6	21.5	85	67.0	52.3	35	106.4	83.1	85	145.8	113.9	35	185.2	144.7	85	224.5	175.5
36	28.4	22.2	86	67.8	53.0	136	107.2	83.7	186	146.5	114.5	236	185.9	145.3	286	225.3	176.1
37	29.2	22.8	87	68.5	53.6	37	107.9	84.4	87	147.3	115.1	37	186.7	145.9	87	226.1	176.7
38	29.9	23.4	88	69.3	54.2	38	108.7	85.0	88	148.1	115.8	38	187.5	146.5	88	226.9	177.3
39	30.7	24.0	89	70.1	54.8	39	109.5	85.6	89	148.9	116.4	39	188.3	147.2	89	227.7	177.9
40	31.5	24.6	90	70.9	55.4	40	110.3	86.2	90	149.7	117.0	40	189.1	147.8	90	228.5	178.6
41	32.3	25.2	91	71.7	56.0	141	111.1	86.8	191	150.5	117.6	241	189.9	148.4	291	229.3	179.2
42	33.1	25.9	92	72.5	56.6	42	111.9	87.4	92	151.3	118.2	42	190.7	149.0	92	230.1	179.8
43	33.9	26.5	93	73.3	57.3	43	112.7	88.0	93	152.1	118.8	43	191.5	149.6	93	230.9	180.4
44	34.7	27.1	94	74.1	57.9	44	113.5	88.7	94	152.9	119.4	44	192.2	150.2	94	231.6	181.0
45	35.5	27.7	95	74.9	58.5	45	114.2	89.3	95	153.6	120.1	45	193.0	150.8	95	232.4	181.6
46	36.2	28.3	96	75.6	59.1	146	115.0	89.9	196	154.4	120.7	246	193.8	151.5	296	233.2	182.2
47	37.0	28.9	97	76.4	59.7	47	115.8	90.5	97	155.2	121.3	47	194.6	152.1	97	234.0	182.9
48	37.8	29.6	98	77.2	60.3	48	116.6	91.1	98	156.0	121.9	48	195.4	152.7	98	234.8	183.5
49	38.6	30.2	99	78.0	61.0	49	117.4	91.7	99	156.8	122.5	49	196.2	153.3	99	235.6	184.1
50	39.4	30.8	100	78.8	61.6	150	118.2	92.4	200	157.6	123.1	250	197.0	153.9	300	236.4	184.7
Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat

for 52 Deg.

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.8	00.6	51	39.6	32.1	101	78.5	63.6	151	117.3	95.0	201	156.2	126.5	251	195.1	158.0
2	01.6	01.3	52	40.4	32.7	02	79.3	64.2	52	118.1	95.7	02	157.0	127.1	52	195.8	158.6
3	02.3	01.9	53	41.2	33.4	03	80.0	64.8	53	118.9	96.3	03	157.8	127.7	53	196.6	159.2
4	03.1	02.5	54	42.0	34.0	04	80.8	65.4	54	119.7	96.9	04	158.5	128.4	54	197.4	159.8
5	03.9	03.1	55	42.7	34.6	05	81.6	66.1	55	120.5	97.5	05	159.3	129.0	55	198.2	160.5
6	04.7	03.8	56	43.5	35.2	106	82.4	66.7	156	121.2	98.2	206	160.1	129.6	256	198.9	161.1
7	05.4	04.4	57	44.3	35.9	07	83.1	67.3	57	122.0	98.8	07	160.9	130.3	57	199.7	161.7
8	06.2	05.0	58	45.1	36.5	08	83.9	68.0	58	122.8	99.4	08	161.6	130.9	58	200.5	162.4
9	07.0	05.7	59	45.8	37.1	09	84.7	68.6	59	123.6	100.1	09	162.4	131.5	59	201.3	163.0
10	07.8	06.3	60	46.6	37.8	10	85.5	69.2	60	124.3	100.7	10	163.2	132.2	60	202.0	163.6
11	08.5	06.9	61	47.4	38.4	111	86.3	69.9	161	125.1	101.3	211	164.0	132.8	261	202.8	164.2
12	09.3	07.6	62	48.2	39.0	12	87.0	70.5	62	125.9	101.9	12	164.7	133.4	62	203.6	164.9
13	10.1	08.2	63	49.0	39.6	13	87.8	71.1	63	126.7	102.6	13	165.5	134.0	63	204.4	165.5
14	10.9	08.8	64	49.7	40.3	14	88.6	71.7	64	127.4	103.2	14	166.3	134.7	64	205.2	166.1
15	11.7	09.4	65	50.5	40.9	15	89.4	72.4	65	128.2	103.8	15	167.1	135.3	65	205.9	166.8
16	12.4	10.1	66	51.3	41.5	116	90.1	73.0	166	129.0	104.5	216	167.9	135.9	266	206.7	167.4
17	13.2	10.7	67	52.1	42.2	17	90.9	73.6	67	129.8	105.1	17	168.6	136.6	67	207.5	168.0
18	14.0	11.3	68	52.8	42.8	18	91.7	74.3	68	130.6	105.7	18	169.4	137.2	68	208.3	168.7
19	14.8	12.0	69	53.6	43.4	19	92.5	74.9	69	131.3	106.4	19	170.2	137.8	69	209.0	169.3
20	15.5	12.6	70	54.4	44.1	20	93.3	75.5	70	122.1	107.0	20	171.0	138.4	70	209.8	169.9
21	16.3	13.2	71	55.2	44.7	121	94.0	76.1	171	132.9	107.6	221	171.7	139.1	271	210.6	170.5
22	17.1	13.8	72	56.0	45.3	22	94.8	76.8	72	133.7	108.2	22	172.5	139.7	72	211.4	171.2
23	17.9	14.5	73	56.7	45.9	23	95.6	77.4	73	134.4	108.9	23	173.3	140.3	73	212.1	171.8
24	18.7	15.1	74	57.5	46.6	24	96.4	78.0	74	135.2	109.5	24	174.1	141.0	74	212.9	172.4
25	19.4	15.7	75	58.3	47.2	25	97.1	78.7	75	136.0	110.1	25	174.8	141.6	75	213.7	173.1
26	20.2	16.4	76	59.1	47.8	126	97.9	79.3	176	136.8	110.8	226	175.6	142.2	276	214.5	173.7
27	21.0	17.0	77	59.8	48.5	27	98.7	79.9	77	137.5	111.4	27	176.4	142.9	77	215.3	174.3
28	21.8	17.6	78	60.6	49.1	28	99.5	80.6	78	138.3	112.0	28	177.2	143.5	78	216.0	174.9
29	22.5	18.2	79	61.4	49.7	29	100.2	81.2	79	139.1	112.6	29	178.0	144.1	79	216.8	175.6
30	23.3	18.9	80	62.2	50.3	30	101.0	81.8	80	139.9	113.3	30	178.7	144.7	80	217.6	176.2
31	24.1	19.5	81	62.9	51.0	131	101.8	82.4	181	140.7	113.9	231	179.5	145.4	281	218.4	176.8
32	24.9	20.1	82	63.7	51.6	32	102.6	83.1	82	141.4	114.5	32	180.3	146.0	82	219.1	177.5
33	25.6	20.8	83	64.5	52.2	33	103.4	83.7	83	142.2	115.2	33	181.1	146.6	83	219.9	178.1
34	26.4	21.4	84	65.3	52.9	34	104.1	84.3	84	143.0	115.8	34	181.8	147.3	84	220.7	178.7
35	27.2	22.0	85	66.1	53.5	35	104.9	85.0	85	143.8	116.4	35	182.6	147.9	85	221.5	179.4
36	28.0	22.7	86	66.8	54.1	136	105.7	85.6	186	144.5	117.1	236	183.4	148.5	286	222.3	180.0
37	28.8	23.3	87	67.6	54.7	37	106.5	86.2	87	145.3	117.7	37	184.2	149.1	87	223.0	180.6
38	29.5	23.9	88	68.4	55.4	38	107.2	86.8	88	146.1	118.3	38	185.0	149.8	88	223.8	181.2
39	30.3	24.5	89	69.2	56.0	39	108.0	87.5	89	146.9	118.9	39	185.7	150.4	89	224.6	181.9
40	31.1	25.2	90	69.9	56.6	40	108.8	88.1	90	147.6	119.6	40	186.5	151.0	90	225.4	182.5
41	31.9	25.8	91	70.7	57.3	141	109.6	88.7	191	148.4	120.2	241	187.3	151.7	291	226.1	183.1
42	32.6	26.4	92	71.5	57.9	42	110.3	89.4	92	149.2	120.8	42	188.1	152.3	92	226.9	183.8
43	33.4	27.1	93	72.3	58.5	43	111.1	90.0	93	150.0	121.5	43	188.8	152.9	93	227.7	184.4
44	34.2	27.7	94	73.0	59.2	44	111.9	90.6	94	150.8	122.1	44	189.6	153.6	94	228.5	185.0
45	35.0	28.3	95	73.8	59.8	45	112.7	91.2	95	151.5	122.7	45	190.4	154.2	95	229.2	185.6
46	35.7	28.9	96	74.6	60.4	146	113.5	91.9	196	152.3	123.3	246	191.2	154.8	296	230.0	186.3
47	36.5	29.6	97	75.4	60.9	47	114.2	92.5	97	153.1	124.0	47	191.9	155.4	97	230.8	186.9
48	37.3	30.2	98	76.2	61.7	48	115.0	93.1	98	153.9	124.6	48	192.7	156.1	98	231.6	187.5
49	38.1	30.8	99	76.9	62.3	49	115.8	93.8	99	154.6	125.2	49	193.5	156.7	99	232.4	188.2
50	38.9	31.5	100	77.7	62.9	150	116.6	94.4	200	155.4	125.9	250	194.3	157.3	300	233.1	188.8
Dist	Dep	Lat	i	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

for 51 Deg.

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.8	00.6	51	39.1	32.8	101	77.4	64.9	151	115.7	97.1	201	154.0	129.2	251	192.3	161.4
2	01.5	01.3	52	39.8	33.4	02	78.1	65.6	52	116.4	97.7	02	154.7	129.9	52	193.0	162.0
3	02.3	01.9	53	40.6	34.1	03	78.9	66.2	53	117.2	98.4	03	155.5	130.5	53	193.8	162.6
4	03.1	02.6	54	41.4	34.7	04	79.7	66.8	54	118.0	99.0	04	156.3	131.1	54	194.6	163.3
5	03.8	03.2	55	42.1	35.3	05	80.4	67.5	55	118.7	99.6	05	157.0	131.8	55	195.3	163.9
6	04.6	03.9	56	42.9	36.0	106	81.2	68.1	156	119.5	100.3	206	157.8	132.4	256	196.1	164.6
7	05.4	04.5	57	43.7	36.6	07	82.0	68.8	57	120.3	100.9	07	158.6	133.1	57	196.9	165.2
8	06.1	05.1	58	44.4	37.3	08	82.7	69.4	58	121.0	101.6	08	159.3	133.7	58	197.6	165.9
9	06.9	05.8	59	45.2	37.9	09	83.5	70.1	59	121.8	102.2	09	160.1	134.4	59	198.4	166.5
10	07.7	06.4	60	46.0	38.6	10	84.3	70.7	60	122.6	102.8	10	160.9	135.0	60	199.2	167.1
11	08.4	07.1	61	46.7	39.2	111	85.0	71.3	161	123.3	103.5	211	161.6	135.6	261	199.9	167.8
12	09.2	07.7	62	47.5	39.9	12	85.8	72.0	62	124.1	104.1	12	162.4	136.3	62	200.7	168.4
13	10.0	08.4	63	48.3	40.5	13	86.6	72.6	63	124.9	104.8	13	163.2	136.9	63	201.4	169.1
14	10.7	09.0	64	49.0	41.1	14	87.3	73.3	64	125.6	105.4	14	163.9	137.6	64	202.2	169.7
15	11.5	09.6	65	49.8	41.8	15	88.1	73.9	65	126.4	106.1	15	164.7	138.2	65	203.0	170.4
16	12.3	10.3	66	50.6	42.4	116	88.9	74.6	166	127.2	106.7	216	165.4	138.8	266	203.7	171.0
17	13.0	10.9	67	51.3	43.1	17	89.6	75.2	67	127.9	107.3	17	166.2	139.5	67	204.5	171.6
18	13.8	11.6	68	52.1	43.7	18	90.4	75.9	68	128.7	108.0	18	167.0	140.1	68	205.3	172.3
19	14.6	12.2	69	52.9	44.4	19	91.2	76.5	69	129.4	108.6	19	167.7	140.8	69	206.0	172.9
20	15.3	12.9	70	53.6	45.0	20	91.9	77.1	70	130.2	109.3	20	168.5	141.4	70	206.8	173.6
21	16.1	13 5	71	54.4	45.6	121	92.7	77.8	171	131.0	109.9	221	169.3	142.1	271	207.6	174.2
22	16.9	14.1	72	55.2	46.3	22	93.4	78.4	72	131.7	110.6	22	170.0	142.7	72	208.3	174.8
23	17.6	14.8	73	55.9	46.9	23	94.2	79.1	73	132.5	111.2	23	170.8	143.3	73	209.1	175.5
24	18.4	15.4	74	56.7	47.6	24	95.0	79.7	74	133.3	111.9	24	171.6	144.0	74	209.9	176.1
25	19.2	16.1	75	57.4	48.2	25	95.7	80.4	75	134.0	112.5	25	172.3	144.6	75	210.6	176.8
26	19.9	16.7	76	58.2	48.9	126	96.5	81.0	176	134.8	113.1	226	173.1	145.3	276	211.4	177.4
27	20.7	17.4	77	59.0	49.5	27	97.3	81.6	77	135.6	113.8	27	173.9	145.9	77	212.2	178.1
28	21.4	18.0	78	59.7	50.1	28	98.0	82.3	78	136.3	114.4	28	174.6	146.6	78	212.9	178.7
29	22.2	18.6	79	60.5	50.8	29	98.8	82.9	79	137.1	115.1	29	175.4	147.2	79	213.7	179.3
30	23.0	19.3	80	61.3	51.4	30	99.6	83.6	80	137.9	115.7	30	176.2	147.9	80	214.5	180.0
31	23.7	19.9	81	62.0	52.1	131	100.3	84.2	181	138.6	116.4	231	176.9	148.5	281	215.2	180.6
32	24.5	20.6	82	62.8	52.7	32	101.1	84.9	82	139.4	117.0	32	177.7	149.1	82	216.0	181.3
33	25.3	21.2	83	63.6	53.4	33	101.9	85.5	83	140.2	117.6	33	178.5	149.8	83	216.8	181.9
34	26.0	21.9	84	64.3	54.0	34	102.6	86.1	84	140.9	118.3	34	179.2	150.4	84	217.5	182.6
35	26.8	22.5	85	65.1	54.6	35	103.4	86.8	85	141.7	118.9	35	180.0	151.1	85	218.3	183.2
36	27.6	23.1	86	65.9	55.3	136	104.2	87.4	186	142.5	119.6	236	180.8	151.7	286	219.1	183.9
37	28.3	23.8	87	66.6	55.9	37	104.9	88.1	87	143.2	120.2	37	181.5	152.4	87	219.8	184.5
38	29.1	24.4	88	67.4	56.6	38	105.7	88.7	88	144.0	120.9	38	182.3	153.0	88	220.6	185.1
39	29.9	25.1	89	68.2	57.2	39	106.5	89.4	89	144.8	121.5	39	183.1	153.6	89	221.4	185.8
40	30.6	25.7	90	68.9	57.9	40	107.2	90.0	90	145.5	122.1	40	183.8	154.3	90	222.1	186.4
41	31.4	26.4	91	69.7	58.5	141	108.0	90.6	191	146.3	122.8	241	184.6	154.9	291	222.9	187.1
42	32.2	27.0	92	70.5	59.1	42	108.8	91.3	92	147.1	123.4	42	185.4	155.6	92	223.7	187.7
43	32.9	27.6	93	71.2	59.8	43	109.5	91.9	93	147.8	124.1	43	186.1	156.2	93	224.4	188.4
44	33.7	28.3	94	72.0	60.4	44	110.3	92.6	94	148.6	124.7	44	186.9	156.9	94	225.2	189.0
45	34.5	28.9	95	72.8	61.1	45	111.1	93.2	95	149.4	125.4	45	187.7	157.5	95	226.0	189.6
46	35.2	29.6	96	73.5	61.7	146	111.8	93.9	196	150.1	126.0	246	188.4	158.1	296	226.7	190.3
47	36.0	30.2	97	74.3	62.4	47	112.6	94.5	97	150.9	126.6	47	189.2	158.8	97	227.5	190.9
48	36.8	30.8	98	75.1	63.0	48	113.4	95.1	98	151.7	127.3	48	190.0	159.4	98	228.3	191.6
49	37.5	31.5	99	75.8	63.6	49	114.1	95.8	99	152.4	127.9	49	190.7	160.1	99	229.0	192.2
50	38.3	32.1	100	76.6	64.3	150	114.9	96.4	200	153.2	128.6	250	191.5	160.7	300	229.8	192.9
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.8	00.7	51	38.5	33.5	101	76.2	66.3	151	114.0	99.0	201	151.7	131.8	251	189.4	164.6
2	01.5	01.3	52	39.2	34.1	02	77.0	66.9	52	114.7	99.7	02	152.5	132.5	52	190.2	165.3
3	02.3	02.0	53	40.0	34.8	03	77.7	67.6	53	115.5	100.4	03	153.2	133.2	53	190.9	166.0
4	03.0	02.6	54	40.8	35.4	04	78.5	68.2	54	116.2	101.0	04	154.0	133.8	54	191.7	166.6
5	03.8	03.3	55	41.5	36.1	05	79.2	68.9	55	117.0	101.7	05	154.7	134.5	55	192.5	167.3
6	04.5	03.9	56	42.3	36.7	106	80.0	69.5	156	117.7	102.3	206	155.5	135.1	256	193.2	167.9
7	05.3	04.6	57	43.0	37.4	07	80.8	70.2	57	118.5	103.0	07	156.2	135.8	57	194.0	168.6
8	06.0	05.2	58	43.8	38.0	08	81.5	70.8	58	119.2	103.6	08	157.0	136.4	58	194.7	169.2
9	06.8	05.9	59	44.5	38.7	09	82.3	71.5	59	120.0	104.3	09	157.7	137.1	59	195.5	169.9
10	07.5	06.6	60	45.3	39.4	10	83.0	72.2	60	120.8	105.0	10	158.5	137.7	60	196.2	170.5
11	08.3	07.2	61	46.0	40.0	111	83.8	72.8	161	121.5	105.6	211	159.2	138.4	261	197.0	171.2
12	09.1	07.9	62	46.8	40.7	12	84.5	73.5	62	122.3	106.3	12	160.0	139.1	62	197.7	171.9
13	09.8	08.5	63	47.5	41.3	13	85.3	74.1	63	123.0	106.9	13	160.8	139.7	63	198.5	172.5
14	10.6	09.2	64	48.3	42.0	14	86.0	74.8	64	123.8	107.6	14	161.5	140.4	64	199.2	173.2
15	11.3	09.8	65	49.1	42.6	15	86.8	75.4	65	124.5	108.2	15	162.3	141.0	65	200.0	173.8
16	12.1	10.5	66	49.8	43.3	116	87.5	76.1	166	125.3	108.9	216	163.0	141.7	266	200.8	174.5
17	12.8	11.2	67	50.6	44.0	17	88.3	76.7	67	126.0	109.5	17	163.8	142.3	67	201.5	175.1
18	13.6	11.8	68	51.3	44.6	18	89.1	77.4	68	126.8	110.2	18	164.5	143.0	68	202.3	175.8
19	14.3	12.5	69	52.1	45.3	19	89.8	78.1	69	127.5	110.9	19	165.3	143.6	69	203.0	176.4
20	15.1	13.1	70	52.8	45.9	20	90.6	78.7	70	128.3	111.5	20	166.0	144.3	70	203.8	177.1
21	15.8	13.8	71	53.6	46.6	121	91.3	79.4	171	129.1	112.2	221	166.8	145.0	271	204.5	177.8
22	16.6	14.4	72	54.3	47.2	22	92.1	80.0	72	129.8	112.8	22	167.5	145.6	72	205.3	178.4
23	17.4	15.1	73	55.1	47.9	23	92.8	80.7	73	130.6	113.5	23	168.3	146.3	73	206.0	179.1
24	18.1	15.7	74	55.8	48.5	24	93.6	81.3	74	131.3	114.1	24	169.1	146.9	74	206.8	179.7
25	18.9	16.4	75	56.6	49.2	25	94.3	82.0	75	122.1	114.8	25	169.8	147.6	75	207.5	180.4
26	19.6	17.1	76	57.4	49.9	126	95.1	82.6	176	132.8	115.4	226	170.6	148.2	276	208.3	181.0
27	20.4	17.7	77	58.1	50.5	27	95.8	83.3	77	133.6	116.1	27	171.3	148.9	77	209.1	181.7
28	21.1	18.4	78	58.9	51.2	28	96.6	84.0	78	134.3	116.8	28	172.1	149.6	78	209.8	182.4
29	21.9	19.0	79	59.6	51.8	29	97.4	84.6	79	135.1	117.4	29	172.8	150.2	79	210.6	183.0
30	22.6	19.7	80	60.4	52.5	30	98.1	85.3	80	135.8	118.1	30	173.6	150.9	80	211.3	183.7
31	23.4	20.3	81	61.1	53.1	131	98.9	85.9	181	136.6	118.7	231	174.3	151.5	281	212.1	184.3
32	24.2	21.0	82	61.9	53.8	32	99.6	86.6	82	137.4	119.4	32	175.1	152.2	82	212.8	185.0
33	24.9	21.6	83	62.6	54.4	33	100.4	87.2	83	138.1	120.0	33	175.8	152.8	83	213.6	185.6
34	25.7	22.3	84	63.4	55.1	34	101.1	87.9	84	138.9	120.7	34	176.6	153.5	84	214.3	186.3
35	26.4	23.0	85	64.2	55.8	35	101.9	88.6	85	139.6	121.4	35	177.4	154.1	85	215.1	186.9
36	27.2	23.6	86	64.9	56.4	136	102.6	89.2	186	140.4	122.0	236	178.1	154.8	286	215.8	187.6
37	27.9	24.3	87	65.7	57.1	37	103.4	89.9	87	141.1	122.7	37	178.9	155.5	87	216.6	188.3
38	28.7	24.9	88	66.4	57.7	38	104.2	90.5	88	141.9	123.3	38	179.6	156.1	88	217.4	188.9
39	29.4	25.6	89	67.2	58.4	39	104.9	91.2	89	142.6	124.0	39	180.4	156.8	89	218.1	189.6
40	30.2	26.2	90	67.9	59.0	40	105.7	91.8	90	143.4	124.6	40	181.1	157.4	90	218.9	190.8
41	30.9	26.9	91	68.7	59.7	141	106.4	92.5	191	144.2	125.3	241	181.9	158.1	291	219.6	190.9
42	31.7	27.6	92	69.4	60.4	42	107.2	93.1	92	144.9	125.9	42	182.6	158.7	92	220.4	191.5
43	32.5	28.2	93	70.2	61.0	43	107.9	93.8	93	145.7	126.6	43	183.4	159.4	93	221.1	192.2
44	33.2	28.9	94	70.9	61.7	44	108.7	94.5	94	146.4	127.3	44	184.2	160.0	94	221.9	192.8
45	34.0	29.5	95	71.7	62.3	45	109.4	95.1	95	147.2	127.9	45	184.9	160.7	95	222.6	193.5
46	34.7	30.2	96	72.5	63.0	146	110.2	95.8	196	147.9	128.6	246	185.7	161.4	296	223.4	194.2
47	35.5	30.8	97	73.2	63.6	47	110.9	96.4	97	148.7	129.2	47	186.4	162.0	97	224.2	194.8
48	36.2	31.5	98	74.0	64.3	48	111.7	97.1	98	149.4	129.9	48	187.2	162.7	98	224.9	195.5
49	37.0	32.1	99	74.7	64.9	49	112.5	97.7	99	150.2	130.5	49	187.9	163.3	99	225.7	196.1
50	37.7	32.8	100	75.5	65.6	150	113.2	98.4	200	150.9	131.2	250	188.7	164.0	300	226.4	196.8
Dist	Dep	Lat	Dep	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

for 49 Deg.

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.7	00.7	51	37.9	34.1	101	75.0	67.6	151	112.2	101.0	201	149.3	134.5	251	186.5	167.9
2	01.5	01.3	52	38.6	34.8	02	75.8	68.2	52	112.9	101.7	02	150.1	135.1	52	187.2	168.6
3	02.2	02.0	53	39.4	35.5	03	76.5	68.9	53	113.7	102.4	03	150.8	135.8	53	187.9	169.3
4	03.0	02.7	54	40.1	36.1	04	77.3	69.6	54	114.4	103.0	04	151.5	136.5	54	188.7	169.9
5	03.7	03.3	55	40.9	36.8	05	78.0	70.2	55	115.1	103.7	05	152.3	137.1	55	189.4	170.6
6	04.5	04.0	56	41.6	37.5	106	78.7	70.9	156	115.9	104.4	206	153.0	137.8	256	190.2	171.3
7	05.2	04.7	57	42.3	38.1	07	79.5	71.6	57	116.6	105.0	07	153.8	138.5	57	190.9	171.9
8	05.9	05.4	58	43.1	38.8	08	80.2	72.3	58	117.4	105.7	08	154.5	139.1	58	191.7	172.6
9	06.7	06.0	59	43.8	39.5	09	81.0	72.9	59	118.1	106.4	09	155.3	139.8	59	192.4	173.3
10	07.4	06.7	60	44.6	40.1	10	81.7	73.6	60	118.9	107.0	10	156.0	140.5	60	193.1	173.9
11	08.2	07.4	61	45.3	40.8	111	82.5	74.3	161	119.6	107.7	211	156.7	141.2	261	193.9	174.6
12	08.9	08.0	62	46.1	41.5	12	83.2	74.9	62	120.3	108.4	12	157.5	141.8	62	194.6	175.3
13	09.7	08.7	63	46.8	42.1	13	83.9	75.6	63	121.1	109.0	13	158.2	142.5	63	195.4	175.9
14	10.4	09.4	64	47.5	42.8	14	84.7	76.3	64	121.8	109.7	14	159.0	143.2	64	196.1	176.6
15	11.1	10.0	65	48.3	43.5	15	85.4	76.9	65	122.6	110.4	15	159.7	143.0	65	196.9	177.3
16	11.9	10.7	66	49.0	44.2	116	86.2	77.6	166	123.3	111.0	216	160.5	144.5	266	197.6	177.9
17	12.6	11.4	67	49.8	44.8	17	86.9	78.3	67	124.1	111.7	17	161.2	145.2	67	198.3	178.6
18	13.4	12.0	68	50.5	45.5	18	87.7	78.9	68	124.8	112.4	18	161.9	145.8	68	199.1	179.3
19	14.1	12.7	69	51.3	46.2	19	88.4	79.6	69	125.5	113.1	19	162.7	146.5	69	199.8	180.0
20	14.9	13.4	70	52.0	46.8	20	89.1	80.3	70	126.3	113.7	20	163.4	147.2	70	200.6	180.6
21	15.6	14.0	71	52.7	47.5	121	89.9	80.9	171	127.0	114.4	221	164.2	147.8	271	201.3	181.3
22	16.3	14.7	72	53.5	48.2	22	90.6	81.6	72	127.8	115.1	22	164.9	148.5	72	202.1	182.0
23	17.1	15.4	73	54.2	48.8	23	91.4	82.3	73	128.5	115.7	23	165.7	149.2	73	202.8	182.6
24	17.8	16.1	74	55.0	49.5	24	92.1	83.0	74	129.3	116.4	24	166.4	149.9	74	203.5	183.3
25	18.6	16.7	75	55.7	50.2	25	92 9	83.6	75	130.0	117.1	25	167.1	150.5	75	204.3	184.0
26	19.3	17.4	76	56.5	50.8	126	93.6	84.3	176	130.7	117.7	226	167.9	151.2	276	205.0	184.6
27	20.1	18.1	77	57.2	51.5	27	94.3	85.0	77	131.5	118.4	27	168.6	151.9	77	205.8	185.3
28	20.8	18.7	78	57.9	52.2	28	95.1	85.6	78	122.2	119.1	28	169.4	152.5	78	206.5	186.0
29	21.5	19.4	79	58.7	52.9	29	95.8	86.3	79	133.0	119.7	29	170.1	153.2	79	207.3	186.6
30	22.3	20.1	80	59.4	53.5	30	96.6	87.0	80	133.7	120.4	30	170.9	153.9	80	208.0	187.3
31	23.0	20.7	81	60.2	54.2	131	97.3	87.6	181	134.5	121.1	231	171.6	154.5	281	208.7	188.0
32	23.8	21.4	82	60.9	54.9	32	98.1	88.3	82	135.2	121.8	32	172.3	155.2	82	209.5	188.7
33	24.5	22.1	83	61.7	55.5	33	98.8	89.0	83	135.9	122.4	33	173.1	155.9	83	210.2	189.3
34	25.3	22.7	84	62.4	56.2	34	99.5	89.6	84	136.7	123.1	34	173.8	156.5	84	211.0	190.0
35	26.0	23.4	85	63.1	56.9	35	100.3	90.3	85	137.4	123.8	35	174.6	157.2	85	211.7	190.7
36	26.7	24.1	86	63.9	57.5	136	101.0	91.0	186	138.2	124.4	236	175.3	157.9	286	212.5	191.3
37	27.5	24.8	87	64.6	58.2	37	101.8	91.7	87	138.9	125.1	37	176.1	158.5	87	213.2	192.0
38	28.2	25.4	88	65.4	58.9	38	102.5	92.3	88	139.7	125.8	38	176.8	159.2	88	213.9	192.7
39	29.0	26.1	89	66.1	59.5	39	103.3	93.0	89	140.4	126.4	39	177.5	159.9	89	214.7	193.3
40	29.7	26.8	90	66.9	60.2	40	104.0	93.7	90	141.1	127.1	40	178.3	160.6	90	215.4	194.0
41	30.5	27.4	91	67.6	60.9	141	104.7	94.3	191	141.9	127.8	241	179.0	161.2	291	216.2	194.7
42	31.2	28.1	92	68.3	61.5	42	105.5	95.0	92	142.6	128.4	42	179.8	161.9	92	216.9	195.3
43	31.9	28.8	93	69.1	62.2	43	106.2	95.7	93	143.4	129.1	43	180.5	162.6	93	217.7	196.0
44	32.7	29.4	94	69.8	62.9	44	107.0	96.3	94	144.1	129.8	44	181.3	163.2	94	218.4	196.7
45	33.4	30.1	95	70.6	63.6	45	107.7	97.0	95	144.9	130.5	45	182.0	163.9	95	219.1	197.4
46	34.2	30.8	96	71.3	64.2	146	108.5	97.7	196	145.6	131.1	246	182.7	164.6	296	219.9	198.0
47	34.9	31.4	97	72.1	64.9	47	109.2	98.3	97	146.3	131.8	47	183.5	165.2	97	220.6	198.7
48	35.7	32.1	98	72.8	65.6	48	109.9	99.0	98	147.1	132.5	48	184.2	165.9	98	221.4	199.4
49	36.4	32.8	99	73.5	66.2	49	110.7	99.7	99	147.8	133.1	49	185.0	166.6	99	222.1	200.0
50	37.1	33.5	100	74.3	66 9	150	111.4	100.4	200	148.6	133.8	250	185.7	167.2	300	222.9	200.7
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.7	00.7	51	37.3	34.8	101	73.9	68.9	151	110.4	103.0	201	147.0	137.1	251	183.6	171.2
2	01.5	01.4	52	38.0	35.5	02	74.6	69.5	52	111.2	103.6	02	147.7	137.7	52	184.3	171.8
3	02.2	02.0	53	38.8	36.2	03	75.3	70.2	53	111.9	104.3	03	148.5	138.4	53	185.0	172.5
4	02.9	02.7	54	39.5	36.8	04	76.1	70.9	54	112.6	105.0	04	149.2	139.1	54	185.8	173.2
5	03.7	03.4	55	40.2	37.5	05	76.8	71.6	55	113.4	105.7	05	149.9	139.8	55	186.5	173.9
6	04.4	04.1	56	41.0	38.2	106	77.5	72.3	156	114.1	106.4	206	150.7	140.5	256	187.2	174.5
7	05.1	04.8	57	41.7	38.9	07	78.3	73.0	57	114.8	107.1	07	151.4	141.2	57	187.9	175.2
8	05.9	05.5	58	42.4	39.5	08	79.0	73.6	58	115.6	107.7	08	152.1	141.8	58	188.7	175.9
9	06.6	06.2	59	43.1	40.2	09	79.7	74.3	59	116.3	108.4	09	152.9	142.5	59	189.4	176.6
10	07.3	06.8	60	43.9	40.9	10	80.4	75.0	60	117.0	109.1	10	153.6	143.2	60	190.1	177.3
11	08.0	07.5	61	44.6	41.6	111	81.2	75.7	161	117.7	109.8	211	154.3	143.9	261	190.9	178.0
12	08.8	08.2	62	45.3	42.3	12	81.9	76.4	62	118.5	110.5	12	155.0	144.5	62	191.6	178.6
13	09.5	08.9	63	46.1	43.0	13	82.6	77.1	63	119.2	111.2	13	155.8	145.2	63	192.3	179.3
14	10.2	09.5	64	46.8	43.6	14	83.4	77.7	64	119.9	111.8	14	156.5	145.9	64	193.1	180.0
15	11.0	10.2	65	47.5	44.3	15	84.1	78.4	65	120.7	112.5	15	157.2	146.6	65	193.8	180.7
16	11.7	10.9	66	48.3	45.0	116	84.8	79.1	166	121.4	113.2	216	158.0	147.3	266	194.5	181.4
17	12.4	11.6	67	49.0	45.7	17	85.6	79.8	67	122.1	113.9	17	158.7	148.0	67	195.3	182.1
18	13.2	12.3	68	49.7	46.4	18	86.3	80.5	68	122.9	114.5	18	159.4	148.6	68	196.0	182.7
19	13.9	13.0	69	50.5	47.1	19	87.0	81.2	69	123.6	115.2	19	160.2	149.3	69	196.7	183.4
20	14.6	13.6	70	51.2	47.7	20	87.8	81.8	70	124.3	115.9	20	160.9	150.0	70	197.5	184.1
21	15.4	14.3	71	51.9	48.4	121	88.5	82.5	171	125.1	116.6	221	161.6	150.7	271	198.2	184.8
22	16.1	15.0	72	52.7	49.1	22	89.2	83.2	72	125.8	117.3	22	162.4	151.4	72	198.9	185.5
23	16.8	15.7	73	53.4	49.8	23	90.0	83.9	73	126.5	118.0	23	163.1	152.1	73	199.7	186.2
24	17.6	16.4	74	54.1	50.5	24	90.7	84.5	74	127.3	118.6	24	163.8	152.7	74	200.4	186.8
25	18.3	17.1	75	54.9	51.2	25	91.4	85.2	75	128.0	119.3	25	164.6	153.4	75	201.1	187.5
26	19.0	17.7	76	55.6	51.8	126	92.1	85.9	176	128.7	120.0	226	165.3	154.1	276	201.9	188.2
27	19.7	18.4	77	56.3	52.5	27	92.9	86.6	77	129.4	120.7	27	166.0	154.8	77	202.6	188.9
28	20.5	19.1	78	57.0	53.2	28	93.6	87.3	78	130.2	121.4	28	166.7	155.5	78	203.3	189.5
29	21.2	19.8	79	57.8	53.9	29	94.3	88.0	79	130.9	122.1	29	167.5	156.2	79	204.0	190.2
30	21.9	20.5	80	58.5	54.5	30	95.1	88.6	80	131.6	122.7	30	168.2	156.8	80	204.8	190.9
31	22.7	21.2	81	59.2	55.2	131	95.8	89.3	181	132.4	123.4	231	168.9	157.5	281	205.5	191.6
32	23.4	21.8	82	60.0	55.9	32	96.5	90.0	82	133.1	124.1	32	169.7	158.2	82	206.2	192.3
33	24.1	22.5	83	60.7	56.6	33	97.3	90.7	83	133.8	124.8	33	170.4	158.9	83	207.0	193.0
34	24.9	23.2	84	61.4	57.3	34	98.0	91.4	84	134.6	125.5	34	171.1	159.5	84	207.7	193.6
35	25.6	23.9	85	62.2	58.0	35	98.7	92.1	85	135.3	126.2	35	171.9	160.2	85	208.4	194.3
36	26.3	24.5	86	62.9	58.6	136	99.5	92.7	186	136.0	126.8	236	172.6	160.9	286	209.2	195.0
37	27.1	25.2	87	63.6	59.3	37	100.2	93.4	87	136.8	127.5	37	173.3	161.6	87	209.9	195.7
38	27.8	25.9	88	64.4	60.0	38	100.9	94.1	88	137.5	128.2	38	174.1	162.3	88	210.6	196.4
39	28.5	26.6	89	65.1	60.7	39	101.7	94.8	89	138.2	128.9	39	174.8	163.0	89	211.4	197.1
40	29.3	27.3	90	65.8	61.4	40	102.4	95.5	90	139.0	129.5	40	175.5	163.6	90	212.1	197.7
41	30.0	28.0	91	66.6	62.1	141	103.1	96.2	191	139.7	130.2	241	176.3	164.3	291	212.8	198.4
42	30.7	28.6	92	67.3	62.7	42	103.9	96.8	92	140.4	130.9	42	177.0	165.0	92	213.6	199.1
43	31.4	29.3	93	68.0	63.4	43	104.6	97.5	93	141.1	131.6	43	177.7	165.7	93	214.3	199.8
44	32.2	30.0	94	68.7	64.1	44	105.3	98.2	94	141.9	132.3	44	178.4	166.4	94	215.0	200.5
45	32.9	30.7	95	69.5	64.8	45	106.0	98.9	95	142.6	133.0	45	179.2	167.1	95	215.7	201.2
46	33.6	31.4	96	70.2	65.5	146	106.8	99.5	196	143.3	133.6	246	179.9	167.7	296	216.5	201.8
47	34.4	32.1	97	70.9	66.2	47	107.5	100.2	97	144.1	134.3	47	180.6	168.4	97	217.2	202.5
48	35.1	32.7	98	71.7	66.8	48	108.2	100.9	98	144.8	135.0	48	181.4	169.1	98	218.0	203.2
49	35.8	33.4	99	72.4	67.5	49	109.0	101.6	99	145.5	135.7	49	182.1	169.8	99	218.7	203.9
50	36.6	34.1	100	73.1	68.2	150	109.7	102.3	200	146.3	136.4	250	182.8	170.5	300	219.4	204.6
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

for 47 Deg.

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.7	00.7	51	36.7	35.4	101	72.6	70.2	151	108.6	104.9	201	144.6	139.6	251	180.5	174.3
2	01.4	01.4	52	37.4	36.1	02	73.4	70.8	52	109.3	105.6	02	145.3	140.3	52	181.3	175.0
3	02.2	02.1	53	38.1	36.8	03	74.1	71.5	53	110.1	106.3	03	146.0	141.0	53	182.0	175.7
4	02.9	02.8	54	38.8	37.5	04	74.8	72.2	54	110.8	107.0	04	146.7	141.7	54	182.7	176.4
5	03.6	03.5	55	39.6	38.2	05	75.5	72.9	55	111.5	107.7	05	147.5	142.4	55	183.4	177.1
6	04.3	04.2	56	40.3	38.9	106	76.2	73.6	156	112.2	108.4	206	148.2	143.1	256	184.1	177.8
7	05.0	04.9	57	41.0	39.6	07	77.0	74.3	57	112.9	109.1	07	148.9	143.8	57	184.9	178.5
8	05.8	05.6	58	41.7	40.3	08	77.7	75.0	58	113.6	109.7	08	149.6	144.5	58	185.6	179.2
9	06.5	06.3	59	42.4	41.0	09	78.4	75.7	59	114.4	110.4	09	150.3	145.2	59	186.3	179.9
10	07.2	06.9	60	43.2	41.7	10	79.1	76.4	60	115.1	111.1	10	151.1	145.9	60	187.0	180.6
11	07.9	07.6	61	43.9	42.4	111	79.8	77.1	161	115.8	111.8	211	151.8	146.6	261	187 7	181.3
12	08.6	08.3	62	44.6	43.1	12	80.6	77.8	62	116.5	112.5	12	152.5	147.3	62	188.5	182.0
13	09.4	09.0	63	45.3	43.8	13	81.3	78.5	63	117.2	113.2	13	153.2	147.9	63	189.2	182.7
14	10.1	09.7	64	46.0	44.5	14	82.0	79.2	64	118.0	113.9	14	153.9	148.6	64	189.9	183.4
15	10.8	10.4	65	46.8	45.1	15	82.7	79.9	65	118.7	114.6	15	154.6	149.3	65	190.6	184.1
16	11.5	11.1	66	47.5	45.8	116	83.4	80.6	166	119.4	115.3	216	155.4	150.0	266	191.3	1848
17	12.2	11.8	67	48.2	46.5	17	84.2	81.3	67	120.1	116.0	17	156.1	150.7	67	192.1	185.5
18	12.9	12.5	68	48.9	47.2	18	84.9	82.0	68	120.8	116.7	18	156.8	151.4	68	192.8	186.1
19	13.7	13.2	69	49.6	47.9	19	85.6	82.7	69	121.6	117.4	19	157.5	152.1	69	193.5	186.8
20	14.4	13.9	70	50.4	48.6	20	86.3	83.4	70	122.3	118.1	20	158.2	152.8	70	194.2	187.5
21	15.1	14.6	71	51.1	49.3	121	87.0	84.0	171	123.0	118.8	221	159.0	153.5	271	194.9	188.2
22	15.8	15.3	72	51.8	50.0	22	87.8	84.7	72	123.7	119.5	22	159.7	154.2	72	195.6	188.9
23	16.5	16.0	73	52.5	50.7	23	88.5	85.4	73	124.4	120.2	23	160.4	154.9	73	196.4	189.6
24	17.3	16.7	74	53.2	51.4	24	89.2	86.1	74	125.2	120.9	24	161.1	155.6	74	197.1	190.3
25	18.0	17.4	75	53.9	52.1	25	89.9	86.8	75	125.9	121.6	25	161.8	156.3	75	197.8	191.0
26	18.7	18.1	76	54.7	52.8	126	90.6	87.5	176	126.6	122.2	226	162.6	157.0	276	198.5	191.7
27	19.4	18.8	77	55.4	53.5	27	91.4	88.2	77	127.3	122.9	27	163.3	157.7	77	199.2	192.4
28	20.1	19.4	78	56.1	54.2	28	92.1	88.9	78	128.0	123.6	28	164.0	158.4	78	200.0	193.1
29	20.9	20.1	79	56.8	54.9	29	92.8	89.6	79	128.8	124.3	29	164.7	159.1	79	200.7	193.8
30	21.6	20.8	80	57.5	55.6	30	93.5	90.3	80	129.5	125.0	30	165.4	159.8	80	201.4	194.5
31	22.3	21.5	81	58.3	56.3	131	94.2	91.0	181	130.2	125.7	231	166.2	160.4	281	202.1	195.2
32	23.0	22.2	82	59.0	57.0	32	94.9	91.7	82	130.9	126.4	32	166.9	161.1	82	202.8	195.9
33	23.7	22.9	83	59.7	57.7	33	95.7	92.4	83	131.6	127.1	33	167.6	161.8	83	203.6	196.6
34	24.5	23.6	84	60.4	58.3	34	96.4	93.1	84	132.4	127.8	34	168.3	162.5	84	204.3	197.3
35	25.2	24.3	85	61.1	59.0	35	97.1	93.8	85	133.1	128.5	35	169.0	163.2	85	205.0	198.0
36	25.9	25.0	86	61.9	59.7	136	97.8	94.5	186	133.8	129.2	236	169.8	163.9	286	205.7	198.7
37	26.6	25.7	87	62.6	60.4	37	98.5	95.2	87	134.5	129.9	37	170.5	164.6	87	206.4	199.3
38	27.3	26.4	88	63.3	61.1	38	99.3	95.9	88	135.2	130.6	38	171.2	165.3	88	207.2	200.0
39	28.1	27.1	89	64.0	61.8	39	100.0	96.5	89	135.9	131.3	39	171.9	166.0	89	207.9	200.7
40	28.8	27.8	90	64.7	62.5	40	100.7	97.2	90	136.7	132.0	40	172.6	166.7	90	208.6	201.4
41	29.5	28.5	91	65.5	63.2	141	101.4	97.9	191	137.4	132.7	241	173.4	167.4	291	209.3	202.1
42	30.2	29.2	92	66.2	63.9	42	102.1	98.6	92	138.1	133.4	42	174.1	168.1	92	210.0	202.8
43	30.9	29.9	93	66.9	64.6	43	102.9	99.3	93	138.8	134.1	43	174.8	168.8	93	210.8	203.5
44	31.6	30.6	94	67.6	65.3	44	103.6	100.0	94	139.5	134.8	44	175.5	169.5	94	211.5	204.2
45	32.4	31.3	95	68.3	66.0	45	104.3	100.7	95	140.3	135.4	45	176.2	170.2	95	212.2	204.9
46	33.1	32.0	96	69.1	66.7	146	105.0	101.4	196	141.0	136.1	246	176.9	170.9	296	212.9	205.6
47	33.8	32.6	97	69.8	67.4	47	105.7	102.1	97	141.7	136.8	47	177.7	171.6	97	213.6	206.3
48	34.5	33.3	98	70.5	68.1	48	106.5	102.8	98	142.4	137.5	48	178.4	172.3	98	214.4	207.0
49	35.2	34.0	99	71.2	68.8	49	107.2	103.5	99	143.1	138.2	49	179.1	173.0	99	215.1	207.7
50	36.0	34.7	100	71.9	69.5	150	107.9	104.2	200	143.9	138.9	250	179.8	173.6	300	215.8	208.4
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.7	00.7	51	36.1	36.1	101	71.4	71.4	151	106.8	106.8	201	142.1	142.1	251	177.5	177.5
2	01.4	01.4	52	36.8	36.8	02	72.1	72.1	52	107.5	107.5	02	142.8	142.8	52	178.2	178.2
3	02.1	02.1	53	37.5	37.5	03	72.8	72.8	53	108.2	108.2	03	143.5	143.5	53	178.9	178.9
4	02.8	02.8	54	38.2	38.2	04	73.5	73.5	54	108.9	108.9	04	144.2	144.2	54	179.6	179.6
5	03.5	03.5	55	38.9	38.9	05	74.2	74.2	55	109.6	109.6	05	144.9	144.9	55	180.3	180.3
6	04.2	04.2	56	39.6	39.6	106	74.9	74.9	156	110.3	110.3	206	145.7	145.7	256	181.0	181.0
7	04.9	04.9	57	40.3	40.3	07	75.7	75.7	57	111.0	111.0	07	146.4	146.4	57	181.7	181.7
8	05.7	05.7	58	41.0	41.0	08	76.4	76.4	58	111.7	111.7	08	147.1	147.1	58	182.4	182.4
9	06.4	06.4	59	41.7	41.7	09	77.1	77.1	59	112.4	112.4	09	147.8	147.8	59	183.1	183.1
10	07.1	07.1	60	42.4	42.4	10	77.8	77.8	60	113.1	113.1	10	148.5	148.5	60	183.8	183.8
11	07.8	07.8	61	43.1	43.1	111	78.5	78.5	161	113.8	113.8	211	149.2	149.2	261	184.5	184.5
12	08.5	08.5	62	43.8	43.8	12	79.2	79.2	62	114.5	114.5	12	149.9	149.9	62	185.3	185.3
13	09.2	09.2	63	44.5	44.5	13	79.9	79.9	63	115.3	115.3	13	150.6	150.6	63	186.0	186.0
14	09.9	09.9	64	45.3	45.3	14	80.6	80.6	64	116.0	116.0	14	151.3	151.3	64	186.7	186.7
15	10.6	10.6	65	46.0	46.0	15	81.3	81.3	65	116.7	116.7	15	152.0	152.0	65	187.4	187.4
16	11.3	11.3	66	46.7	46.7	116	82.0	82.0	166	117.4	117.4	216	152.7	152.7	266	188.1	188.1
17	12.0	12.0	67	47.4	47.4	17	82.7	82.7	67	118.1	118.1	17	153.4	153.4	67	188.8	188.8
18	12.7	12.7	68	48.1	48.1	18	83.4	83.4	68	118.8	118.8	18	154.1	154.1	68	189.5	189.5
19	13.4	13.4	69	48.8	48.8	19	84.1	84.1	69	119.5	119.5	19	154.8	154.8	69	190.2	190.2
20	14.1	14.1	70	49.5	49.5	20	84.8	84.8	70	120.2	120.2	20	155.6	155.6	70	190.9	190.9
21	14.8	14.8	71	50.2	50.2	121	85.6	85.6	171	120.9	120.9	221	156.3	156.3	271	191.6	191.6
22	15.6	15.6	72	50.9	50.9	22	86.3	86.3	72	121.6	121.6	22	157.0	157.0	72	192.3	192.3
23	16.3	16.3	73	51.6	51.6	23	87.0	87.0	73	122.3	122.3	23	157.7	157.7	73	193.0	193.0
24	17.0	17.0	74	52.3	51.3	24	87.7	87.7	74	123.0	123.0	24	158.4	158.4	74	193.7	193.7
25	17.7	17.7	75	53.0	53.0	25	88.4	88.4	75	123.7	123.7	25	159.1	159.1	75	194.4	194.4
26	18.4	18.4	76	53.7	53.7	126	89.1	89.1	176	124.4	124.4	226	159.8	159.8	276	195.2	195.2
27	19.1	19.1	77	54.4	54.4	27	89.8	89.8	77	125.2	125.2	27	160.5	160.5	77	195.9	195.9
28	19.8	19.8	78	55.2	55.2	28	90.5	90.5	78	125.9	125.9	28	161.2	161.2	78	196.6	196.6
29	20.5	20.5	79	55.9	55.9	29	91.2	91,2	79	126.6	126.6	29	161.9	161.9	79	197.3	197.3
30	21.2	21.2	80	56,6	56.6	30	91.9	91.9	80	127.3	127.3	30	162.6	162.6	80	198.0	198.0
31	21.9	21.9	81	57.3	57.3	131	92.6	92.6	181	128.0	128.0	231	163.3	163.3	281	198.7	198.7
32	22.6	22.6	82	58.0	58.0	32	93.3	93.3	82	128.7	128.7	32	164.0	164.0	82	199.4	199.4
33	23.3	23.3	83	58.7	58.7	33	94.0	94.0	83	129.4	129.4	33	164.7	164.7	83	200.1	200.1
34	24.0	24.0	84	59.4	59.4	34	94.7	94.7	84	130.1	130.1	34	165.5	165.5	84	200.8	200.8
35	24.7	24.7	85	60.1	60.1	35	95.5	95.5	85	130.8	130.8	35	166.2	166.2	85	201.5	201.5
36	25.5	25.5	86	60.8	60.8	136	96.2	96.2	186	131.5	131.5	236	166.9	166.9	286	202.2	202.2
37	26.2	26.2	87	61.5	61.5	37	96.9	96.9	87	132.2	132.2	37	167.6	167.6	87	202.9	202.9
38	26.9	26.9	88	62.2	62.2	38	97.6	97.6	88	132.9	132.9	38	168.3	168.3	88	203.6	203.6
39	27.6	27.6	89	62.9	62.9	39	98.3	98.3	89	133.6	133.6	39	169.0	169.0	89	204.3	204.3
40	28.3	28.3	90	63.6	63.6	40	99.0	99.0	90	134.3	134.3	40	169.7	169.7	90	205.1	205.1
41	29.0	29.0	91	64.3	64.3	141	99.7	99.7	191	135.1	135.1	241	170.4	170.4	291	205.8	205.8
42	29.7	29.7	92	65.1	65.1	42	100.4	100.4	92	135.8	135.8	42	171.1	171.1	92	206.5	206.5
43	30.4	30.4	93	65.8	65.8	43	101.1	101.1	93	136.5	136.5	43	171.8	171.8	93	207.2	207.2
44	31.1	31.1	94	66.5	66.5	44	101.8	101.8	94	137.2	137.2	44	192.5	172.5	94	207.9	207.9
45	31.8	31.8	95	67.2	67.2	45	102.5	102.5	95	137.9	137.9	45	173.2	173.2	95	208.6	208.6
46	32.5	32.5	96	67.9	67.9	146	103.2	103'2	196	138.6	138.6	246	173 9	173.9	296	209.3	209.3
47	33.2	33.2	97	68.6	68.6	47	103.9	103.9	97	139.3	139.3	47	174.6	174.6	97	210.0	210.0
48	33.9	33.9	98	69.3	69.3	48	104.6	104.6	98	140.0	140.0	48	175.4	175.4	98	210.7	210.7
49	34.6	34.6	99	70.0	70.0	49	105.4	105.4	99	140.7	140.7	49	176.1	176.1	99	211.4	211.4
50	35.4	35.4	100	70.7	70.7	150	106.1	106.1	200	141.4	141.4	250	176.8	176.8	300	212.1	212.1
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Number for the Readier finding the Course in the foregoing Tables of Difference of Latitude and Departure.

Dist. and Diff. of Lat.				Dist. and Departure.				Diff. of Lat. and Dep.			
Num	Deg.	Num	Deg.	Num	Deg.	Num	Deg.	Num	Deg.	Num	Deg.
1000	1	17	89	17	1	1000	89	2	1	5882	89
999	2	35	88	35	2	999	88	3	2	2855	88
998	3	52	87	52	3	998	87	5	3	1908	87
997	4	70	86	70	4	997	86	7	4	1432	86
996	5	87	85	87	5	996	85	9	5	1145	85
995	6	105	84	105	6	995	84	10	6	950	84
993	7	122	83	122	7	993	83	12	7	816	83
990	8	139	82	139	8	990	82	14	8	711	82
988	9	156	81	156	9	988	81	16	9	632	81
985	10	173	80	173	10	985	80	18	10	568	80
982	11	191	79	191	11	982	79	19	11	515	79
978	12	208	78	208	12	978	78	21	12	470	78
974	13	225	77	225	13	974	77	23	13	433	77
970	14	242	76	242	14	970	76	25	14	401	76
966	15	259	75	259	15	966	75	27	15	373	75
961	16	276	74	276	16	961	74	29	16	349	74
956	17	292	73	292	17	956	73	30	17	328	73
951	18	309	72	309	18	951	72	32	18	308	72
945	19	326	71	326	19	945	71	34	19	290	71
940	20	342	70	342	20	940	70	36	20	275	70
934	21	358	69	358	21	934	69	38	21	260	69
927	22	375	68	375	22	927	68	40	22	248	68
921	23	391	67	391	23	921	67	42	23	236	67
914	24	407	66	407	24	914	66	45	24	225	66
906	25	423	65	423	25	906	65	47	25	214	65
899	26	438	64	438	26	899	64	49	26	205	64
891	27	454	63	454	27	891	63	51	27	196	63
883	28	470	62	470	28	883	62	53	28	188	62
875	29	485	61	485	29	875	61	55	29	180	61
866	30	500	60	500	30	866	60	58	30	173	60
857	31	515	59	515	31	857	59	60	31	166	59
848	32	530	58	530	32	848	58	62	32	160	58
839	33	545	57	545	33	839	57	65	33	154	57
829	34	559	56	559	34	829	56	67	34	148	56
819	35	574	55	574	35	819	55	70	35	143	55
809	36	588	54	588	36	809	54	73	36	138	54
799	37	602	53	602	37	799	53	75	37	133	53
788	38	616	52	616	38	788	52	78	38	128	52
777	39	629	51	629	39	777	51	81	39	123	51
766	40	643	50	643	40	766	50	84	40	119	50
755	41	656	49	656	41	755	49	87	41	115	49
743	42	669	48	669	42	743	48	90	42	111	48
731	43	682	47	682	43	731	47	93	43	107	47
719	44	695	46	695	44	719	46	96	44	103	46
707	45	707	45	707	55	707	45	100	45	100	45

The

The Uſe of the Tables of Difference of Latitude *and* Departure, *in Working any of the Caſes of* Plain-Sailing.

IN theſe Tables, the Courſe if leſs than 4 Points, or 45 Degrees, will be found at the Top of the Tables; but if it is more than 4 Points, or 45 Degrees, it will be found at the Bottom of the Tables; and on every Side there are Six Columns for the Diſtances, mark'd Diſt. which contain 50 Miles in each Column, the Firſt beginning at 1, and ending at 50; the Second beginning at 51, and ending at 100, and ſo on to 300 Miles Diſtance; and to each of theſe Columns of Diſtance there belongs two other Columns, ſhewing the Difference of Latitude and Departure to any of them Diſtances, mark'd Lat. and Dep. in which you are to obſerve, that if your Courſe be found at the Top of the Tables, then you are to take the Difference of Latitude and Departure as they are mark'd at Top; but if your Courſe be found at Bottom, then you muſt take them as they are mark'd at Bottom.

Note, In any Caſe where the Courſe is given in Points, half Points, or Quarters, you muſt make uſe of the following Tables of Difference of Latitude and Departure, which are calculated for Points, *&c.* but where the Courſe is given in Degrees, or where it is not given at all, you muſt make uſe of the foregoing Tables of Difference of Latitude and Departure.

Plain Sailing, Caſe the Firſt.

Courſe and Diſtance being given, to find the Difference of Latitude and Departure.

RULE.

Find your Courſe as before directed, and look in ſome of the Diſtance Columns belonging to that Courſe, for your Diſtance, the Difference of Latitude and Departure anſwering to that Diſtance, will be the Difference of Latitude and Departure required.

Example

EXAMPLE I.

A Ship Sails N.N.E. 136 *Miles, I demand her Difference of Latitude and Departure.*

Having found my Courſe, which is 2 Points in the Table for Points, I find my Diſtance 136 and the third Column for Diſtances, and right againſt that, I find 125.7 Tenths for my Difference of Latitude, and 52.0 Tenths for my Departure.

Note, In all Caſes whatſoever, if the given Side or Sides be in Miles, then the Sides found by the Table, will alſo be in Miles; but if the given Side or Sides be Leagues, then the Sides found will alſo be Leagues.

Plain Sailing, Caſe the Second.

Courſe and Difference of Latitude being given, to find the Diſtance and Departure.

RULE.

Find your Courſe as before, then look in ſome of the Difference of Latitude Columns belonging to that Courſe, for your Difference of Latitude, the Diſtance and Departure anſwering to that Difference of Latitude, will be the Diſtance and Departure required.

EXAMPLE.

A Ship Sails S. 48 *Degrees* 00 *Minutes, E. till the Difference of Latitude be* 164 *Leagues, I demand her Diſtance and Departure?*

Having found my Courſe 48 Degrees at the Bottom of the Tables, I look in ſome of the Columns mark'd Latitude at Bottom, for the neareſt I can find to my Difference of Latitude, which is 163.9, and anſwering to that, I find for my Diſtance 245 Leagues, and for my Departure 182.0 Leagues.

Plain Sailing, Caſe the Third.

Courſe and ,Departure being given, to find the Diſtance and Difference of Latitude.

RULE.

Find your Courſe as before, then look in ſome of the Departure Columns belonging to that Courſe, for your Departure, the Diſtance and

and Difference of Latitude anſwering to that Departure, will be the Diſtance and Difference of Latitude required.

EXAMPLE.

A Ship ſails S.W. by S. till her Departure be 165 Miles: I demand her Diſtance and Difference of Latitude.

Having found the Courſe, which is 3 Points at the Top of the Table for Points, I look in ſome of the Columns mark'd *Dep.* at Top, for the neareſt I can find to my Departure, which is 165.0, and anſwering to that I find for my Diſtance 297 Miles, and for my Difference of Latitude 246.9 Miles.

Note, In any Caſe where the given Side is too big to be found in the Tables, then divide it by 2, 3, 4, or any other Number that will make it ſmall enough to be found, and then the required Sides, when found, muſt be multiplied by the ſame Number; but the Courſe muſt never be multiplied nor divided.

Plain Sailing, Caſe the Fourth.

Diſtance and Difference of Latitude being given, to find the Courſe and Departure.

RULE.

Put two Cyphers to the Difference of Latitude, and divide it by the Diſtance (without taking any Notice of the Comma that ſtands between the Miles and Tenths) and note the Quotient: Then look in the Table of Numbers (at the end of the Tables of Difference of Latitude and Departure) in the Columns belonging to Diſtance and Difference of Latitude, for the neareſt Number to that Quotient, the Degrees anſwering to that Number will be the Courſe. Then to find the Departure, proceed as in Caſe the firſt. But here you are to obſerve, that in all Caſes where the Courſe is to be found by the Table of Numbers, the Difference of Latitude and Departure are ſuppoſed always to be in Miles and Tenths, as for Example, 112,4 Tenths, 207,9 Tenths, *&c.* ſo that if at any Time either of them ſhould be given in Miles without Tenths, as 117, 124, *&c.* You are then to put a Cypher to them to ſupply the Place of Tenths, and call them 117,0 Tenths, 124,0 Tenths, *&c.* and then put two Cyphers more according to your other Rules, to find the Number for the Courſe.

EXAMPLE.

A Ship Sails between the North and Weſt, till her Diſtance is 276 *Miles, and her Difference of Latitude* 211.4 *Miles, I demand her Courſe and Departure.*

Having put two Cyphers to the Difference of Latitude, which makes it 211400, I divide it by the Diſtance 276, and find the Quotient to be 766 nearly, then I look in the Table of Numbers (under *Diſt.* and *Diff.* of *Lat.* (for the neareſt to it which is 766, againſt which I find 40 Degrees for my Courſe, and with that Courſe and my given Diſtance, I find my Departure to be 177.4 Miles, (by Caſe the Firſt.)

Plain Sailing, Caſe the Fifth.

Diſtance and Departure being given, to find the Courſe and Difference of Latitude.

RULE.

Put two Cyphers to the Departure, then divide it by the Diſtance, and look in the Table of Numbers, in the Columns belonging to Diſtance and Departure, for the neareſt Number to the Quotient; the Degrees anſwering to that Number will be the Courſe, and then the Difference of Latitude may be found, (by Caſe the Firſt.)

EXAMPLE.

A Ship Sails between the South and Eaſt, till her Diſtance is 546 *Miles, and her Departure* 412 *Miles, I demand her Courſe and Difference of Latitude.*

Having put a Cypher to my Departure to ſupply the Place of Tenths, which makes it 412.0 and then two more Cyphers according to the Rule for this Caſe, which makes it 412000, I divide it by the Diſtance 546, and find the Quotient to be 754, againſt the neareſt to which, *viz.* 755 in the Table of Numbers under *Diſt.* and *Dep.* I find 49 Degrees for my Courſe; and with that Courſe and my Diſtance (divided by 2, becauſe it is too big to be found in the Tables) I find a Difference of Latitude 179,1 (by Caſe the Firſt) *which multiplied by 2,* becauſe the Diſtance was divided by 2, gives 358,2 *for my whole* Difference of Latitude.

Plain

Plain-Sailing, Caſe the Sixth.

Difference of Latitude and Departure being given, to find the Courſe and Diſtance.

RULE.

Put two Cyphers to the Departure, and divide it by the Difference of Latitude, then look in the Table of Numbers, in the Columns belonging to Difference of Latitude and Departure, for the neareſt Number to the Quotient, the Degrees anſwering to that Number will be the Courſe. Then to find the Diſtance, proceed as in Caſe the 2*d*, or 3*d*.

EXAMPLE.

A Ship Sails between the North and Weſt, till her Difference of Latitude is 184 *Miles, and her Departure* 115 *Miles, I demand her Courſe and Diſtance.*

Having ſupply'd the Places of Tenths in both theſe Sides, which makes them 184.0, and 115.0, I then put two Cyphers to the Departure which makes it 115000, and divide it by the Difference of Latitude 1840, and find the Quotient to be 62; againſt which in the Table of Numbers, under Difference of Latitude and Departure, I find 32 Degrees for my Courſe, and with that Courſe, and my Difference of Latitude, (by Caſe the Second) or with that Courſe, and my Departure (by Caſe the Third) I find my Diſtance to be 217 Miles.

Note, By theſe foregoing Rules for *Plain Sailing*, you may work any Caſe in Traverſe, Mercator, Parallel and Middle Latitude, only by ſuppoſing the Names of the Sides and Angles in Mercator, Parallel and Middle Latitude, to be changed into the Sides and Angles they repreſent in *Plain Sailing*.

TRAVERSE.

The ſeveral Courſes and Diſtances a Ship ſails being given, to find what direct Courſe and Diſtance ſhe has made good, and her Difference of Latitude and Departure.

RULE.

Make a Table as on the following Side, and ſet down in it your ſeveral Courſes and Diſtances, then by the Rule, for Caſe the Firſt of *Plain-Sailing*, find the Difference of Latitude and Departure to each of the Courſes

Courſes and Diſtances, and ſet them down in the Table, oppoſite to the Courſes they belong to, taking Notice that the Difference of Latitude muſt always be ſet in the North Column, if the Courſe be Northerly, and in the South Column if the Courſe be Southerly; and the Departure muſt always be put in the Eaſt Column, if the Courſe be Eaſterly, and in the Weſt Column, if it be Weſterly.

Then add up all your Columns of North, South, Eaſt and Weſt, ſeparately, and ſet down their reſpective Sums at the Bottom of each Column, and if you have but one Column of Northing or Southing, and but one of Eaſting or Weſting, then their Sums will be the Difference of Latitude and Departure of the ſame Name with the Column they ſtand under; that is, the Difference of Latitude will be Northerly, if it ſtands under the North Column; and the Departure Eaſterly, if it ſtands under the Eaſt Column, *&c.*

But if you have Numbers in all the Columns of North, South, Eaſt, and Weſt, then take the Sums of the North and South Columns, and ſubtract the leſſer from the greater, the Remainder will be the Difference of Latitude, of the ſame Name with the greater of them: Alſo do the ſame with the Sums of the Eaſt and Weſt Columns for the Departure; then with that Difference of Latitude and Departure, find the Courſe and Diſtance, as in Caſe the Sixth, *of Plain Sailing.*

EXAMPLE.

A Ship Sails the following Courſes, viz. *SSW.* 54 *Miles, W. by S.* 39, *NW. by N* 40, *NE. by E.* 69, *and NNW.* 60 *Miles; I demand her direct Courſe, Diſtance, Difference of Latitude and Departure.*

		Diff. of Lat.		Departure	
Courſes	Diſt.	North	South	Eaſt	Weſt.
S S W	54		49.9		20.7
W by S	39		7.6		38,2
NW by N	40	33.3			22.2
NE by E	69	38.3		57.4	
N N W	60	55.4			23.0
		127.0	57.5	57.4	104.1
		57.5			57.4
Diff. Lat	N.ly	69.5	Dep	W.erly	46.7

Note, 'Tis by this Method, that the Difference of Latitude and Departure are found in working any Days Work at Sea; and from the Difference of Latitude and Departure ſo found, we find the Courſe, Diſtance and Latitude by Dead-Reckoning, Meridian Diſtance and Longitude made; all which will be further explained in the Rules for keeping a Journal, Courſe N. 34.00 W. Diſtance 84 Miles.

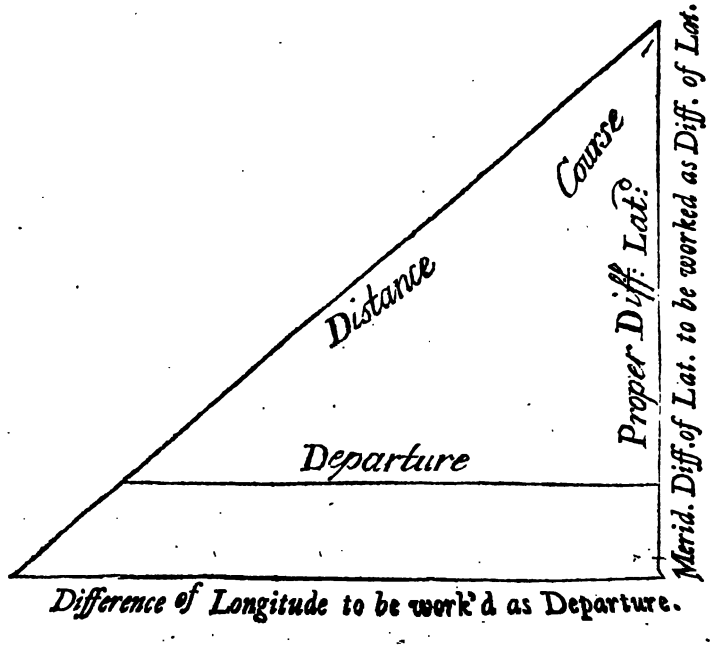
To

To Work any Right-angled Triangle, by the foregoing Rules for Plain Sailing.

In all Right-angled Triangles that are to be work'd by the Tables, you are to ſuppoſe four Things, *viz.* Courſe, Diſtance, Difference of Latitude and Departure, two of which muſt always be given to find the other two: Then as theſe Rules are wrote for working of *Plain-Sailing*, if you would work any other Sailing by them, as Mercator, Parallel, Middle Latitude, or any other Right-angled Triangle, you muſt ſuppoſe the Sides and Angles of that Triangle to be called by the ſame Name that the Sides and Angles they repreſent in *Plain-Sailing* are called by, and then work them as if it was a Caſe in *Plain Sailing*.

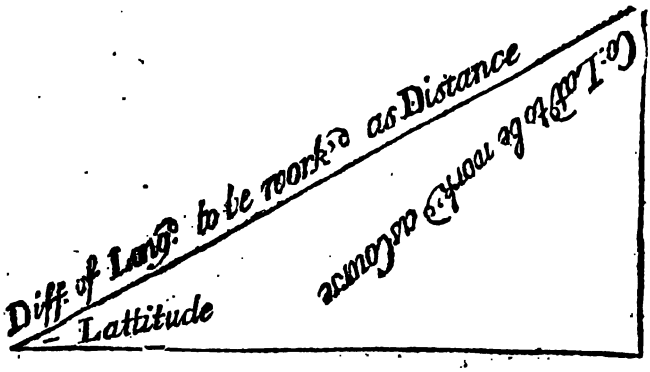
As for Example. The North and South Line, in any Right-angled Triangle (by whatever Name it is called in the Sailing it belongs to) muſt be work'd as if it was Difference of Latitude in *Plain Sailing*: The Eaſt and Weſt Line as Departure; the long Side as Diſtance, and the Angle oppoſite to the Eaſt and Weſt Line as Courſe. *For Example ſee the following Figures.*

Figure for *Mercator's Sailing.*


Course
Distance
Departure
Proper Diff. Lat.
Merid. Diff. of Lat. to be worked as Diff. of Lat.
Difference of Longitude to be work'd as Departure.

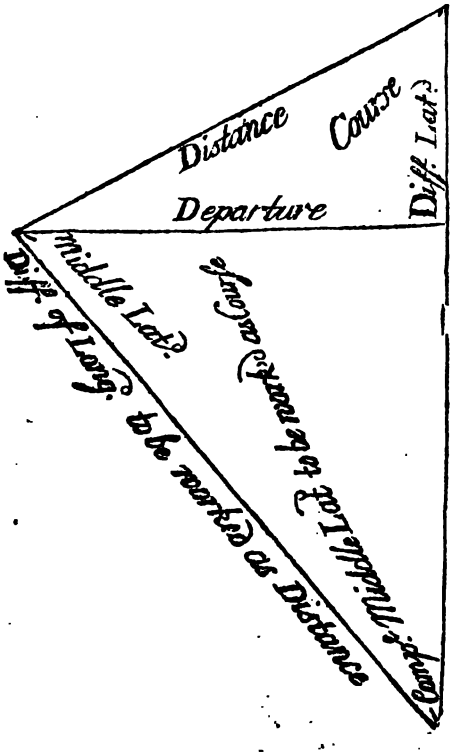
Figure

Figure for *Parallel Sailing.*



Diſtance to be work'd as Departure.

Figure for *Middle Latitude Sailing.*



Mercator's Sailing, Caſe the Firſt.

The Latitude and Longitude of any two Places being given, to find what Courſe and Diſtance a Ship muſt Sail from one Place to the other.

RULE.

Having the two Latitudes and two Longitudes given; find the proper Difference of Latitude, the Meridional Difference of Latitude, and the Difference of Longitude, (as by the Rules for that Purpoſe) then with the Meridional Difference of Latitude, and the Difference of Longitude (taken as Difference of Latitude and Departure) find the Courſe by the ſixth Caſe of *Plain Sailing*, and with that Courſe, and the proper Difference of Latitude, find the Diſtance by Caſe the Second of *Plain Sailing*.

EXAMPLE.

What Courſe and Diſtance muſt a Ship Sail from a Place in Latitude 50.00 *North, and Longitude,* 03.10 *Weſt, to a Place in Latitude of* 17.10 *North, and Longitude* 59.11 *Weſt?*

Lat. ſail'd from ——	50 00 N.	Merid. Parts		Long. ſail'd from	03 10 W.
Lat. bound to ——	17 10 N.	3474		Long. bound to	59 11 W.
	32 50	1046			56 01
	60	2428			60
Proper Diff. of Lat.	1970 Miles	Mer. Diff. of Lat.		Diff. of Long.	3361 Miles

Having put two Cyphers to the Difference of Longitude, and divided it by the Meridional Difference of Latitude, I find the Quotient to be 138, againſt which in the Table of Numbers (under Difference of Latitude and Departure) I find 54 Degrees for my Courſe; and with that Courſe, and my proper Difference of Latitude, I find my Diſtance to be 3348 Miles.

The Courſe being thus found in Degrees, I want in the next Place to know which Quarter of the Compaſs it is in, that is, whether it be ſo many Degrees from the North towards the Eaſt, or from the North towards the Weſt, *&c.* to do which take the following Rule.

If you are to ſail from a greater North Latitude to a leſs, or from North Latitude into South; or from a leſſer South Latitude to a greater, then you muſt ſail to the Southward.

But if you are to ſail from a greater South Latitude to a leſſer, or from South Latitude into North; or from a leſs North Latitude to a greater, you muſt ſail to the Northward.

If you are to ſail from a Greater Eaſt Longitude to a Leſſer, or from a Leſſer Weſt Longitude to a Greater; or from Eaſt Longitude into Weſt, you muſt Sail to the Weſtward, except the Difference of Longitude be more than 180 Degrees, and then you muſt ſail to the Eaſtward.

But if you are to go from a Greater Weſt Longitude to a Leſſer, or from a Leſſer Eaſt Longitude to a Greater, or from Weſt Longitude into Eaſt, you muſt ſail to the Eaſtward, except your Difference of Longitude be more than 180 Degrees, and then you muſt ſail to the Weſtward.

EXAMPLE.

In the foregoing Caſe of Mercator's Sailing, I find by the two Latitudes, that I am bound from a Greater North Latitude to a Leſſer, *viz.* from 50.00 N. to 17.10 N. then by the Rule I muſt ſail to the Southward; and I find by the two Longitudes, that I am bound from a Leſſer Weſt Longitude to a Greater, *viz.* from 3.10 Weſt to 59.11 Weſt, then by that Rule I am to go to the Weſtward, therefore my Courſe will be South 54.00 Weſt, or SW. $\frac{3}{4}$ Weſt neareſt.

This firſt Caſe of Mercator, being the Caſe that is always made uſe of, to find the Courſe and Diſtance from Place to Place, or to find the Bearing and Diſtance of any Place, from the Ship at any Time, I have ſet down the Work of it at large, and ſhall leave the other Caſe for the Reader to exerciſe himſelf with, by working them by the Rules already given him.

A Table of the Angles which every Point of the Compaſs makes with the Meridian.

	D M		D M		D M		D M
$\frac{1}{4}$	2 49	$2\frac{1}{4}$	25 19	$4\frac{1}{4}$	47 49	$6\frac{1}{4}$	70 19
$\frac{1}{2}$	5 37	$2\frac{1}{2}$	28 07	$4\frac{1}{2}$	50 38	$6\frac{1}{2}$	73 07
$\frac{3}{4}$	8 26	$2\frac{3}{4}$	30 56	$4\frac{3}{4}$	53 26	$6\frac{3}{4}$	75 56
1	11 15	3	33 45	5	56 15	7	78 45
$1\frac{1}{4}$	14 04	$3\frac{1}{4}$	36 34	$5\frac{1}{4}$	59 04	$7\frac{1}{4}$	81 34
$1\frac{1}{2}$	16 52	$3\frac{1}{2}$	39 22	$5\frac{1}{2}$	61 53	$7\frac{1}{2}$	84 23
$1\frac{3}{4}$	19 41	$3\frac{3}{4}$	42 11	$5\frac{3}{4}$	64 41	$7\frac{3}{4}$	87 11
2	22 30	4	45 00	6	67 30	8	90 00

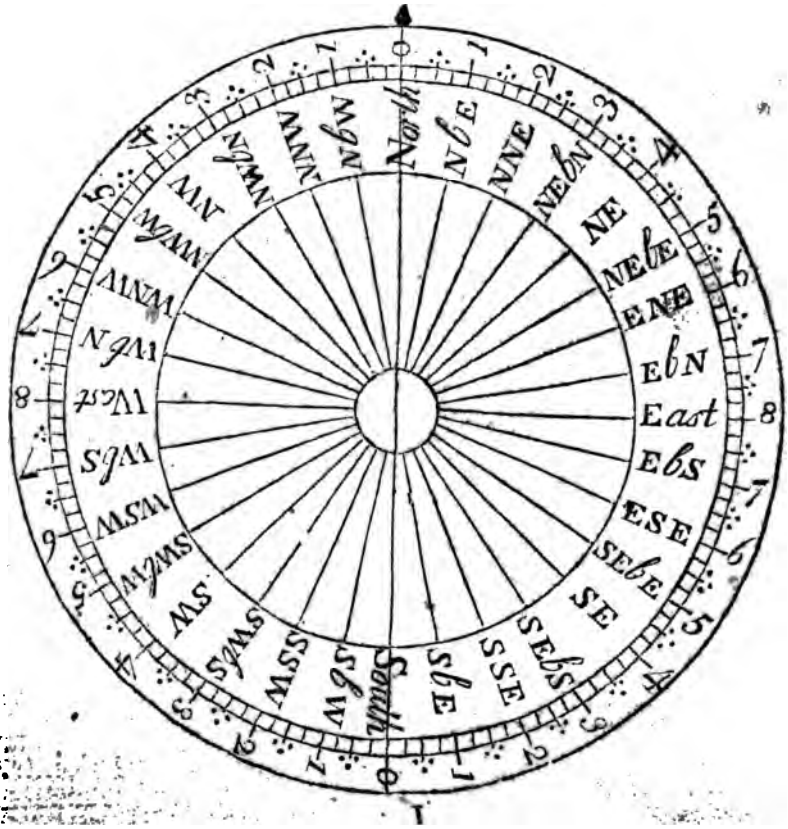
The Uſe of this Table is to turn Points into Degrees, or Degrees into Points, as follows: Suppoſe I would know how many Degrees 5 Points are, then I look for 5 Points, *and againſt it* I find 56 deg. 15 min. or if I would know how many Points 42 deg. 17 min. are, *I look for the* neareſt to it, which is 42 deg. 11 min. and againſt that *ſtands 3 ¾ Points.*

The Courſes and Diſtances being ſet down in a Traverſe Table, as in Page (52) it will be found neceſſary for the ready looking them out in the Tables of Difference of Latitude and Departure, to know what Angles they make with the Meridian, (or as we commonly ſay) to know how many Points there are, for which reaſon I have here given the Figure of the Mariner's Compaſs, which is to be uſed as follows.

Example 1. Suppoſe I would know how many Points I muſt look out for in the Tables of Difference of Latitude and Departure, for a SW. by W. Courſe.

Look in the Figure below, and againſt the Point mark'd with SW. by W. you will ſee the Figure 5, which ſhews that you muſt look out for 5 Points.

Example 2. How many Points is E. by N. $\frac{3}{4}$ E. againſt E. by N. I find 7, and my Courſe being $\frac{3}{4}$ Point more, it makes $7\frac{3}{4}$.



Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	01.0	00.0	51	50.9	02.5	101	100.9	05.0	151	150.8	07.4	201	200.8	09.9	251	250.7	12.3
2	02.0	00.1	52	51.9	02.6	02	101.9	05.0	52	151.8	07.5	02	201.8	09.9	52	251.7	12.4
3	03.0	00.1	53	52.9	02.6	03	102.9	05.1	53	152.8	07.5	03	202.8	10.0	53	252.7	12.4
4	04.0	00.2	54	53.9	02.7	04	103.9	05.1	54	153.8	07.6	04	203.8	10.0	54	253.7	12.5
5	05.0	00.2	55	54.9	02.7	05	104.9	05.2	55	154.8	07.6	05	204.8	10.1	55	254.7	12.5
6	06.0	00.3	56	55.9	02.7	106	105.9	05.2	156	155.8	07.7	206	205.8	10.1	256	255.7	12.6
7	07.0	00.3	57	56.9	02.8	07	106.9	05.3	57	156.8	07.7	07	206.8	10.2	57	256.7	12.6
8	08.0	00.4	58	57.9	02.8	08	107.9	05.3	58	157.8	07.8	08	207.8	10.2	58	257.7	12.7
9	09.0	00.4	59	58.9	02.9	09	108.9	05.4	59	158.8	07.8	09	208.7	10.3	59	258.7	12.7
10	10.0	00.5	60	59.9	02.9	10	109.9	05.4	60	159.8	07.9	10	209.7	10.3	60	259.7	12.8
11	11.0	00.5	61	60.9	03.0	111	110.9	05.5	161	160.8	07.9	211	210.7	10.4	261	260.7	12.8
12	12.0	00.6	62	61.9	03.0	12	111.9	05.5	62	161.8	08.0	12	211.7	10.4	62	261.7	12.9
13	13.0	00.6	63	62.9	03.1	13	112.9	05.5	63	162.8	08.0	13	212.7	10.5	63	262.7	12.9
14	14.0	00.7	64	63.9	03.1	14	113.9	05.6	64	163.8	08.1	14	213.7	10.5	64	263.7	13.0
15	15.0	00.7	65	64.9	03.2	15	114.9	05.6	65	164.8	08.1	15	214.7	10.6	65	264.7	13.0
16	16.0	00.8	66	65.9	03.2	116	115.9	05.7	166	165.8	08.2	216	215.7	10.6	266	265.7	13.1
17	17.0	00.8	67	66.9	03.3	17	116.9	05.7	67	166.8	08.2	17	216.7	10.7	67	266.7	13.1
18	18.0	00.9	68	67.9	03.3	18	117.9	05.8	68	167.8	08.3	18	217.7	10.7	68	267.7	13.2
19	19.0	00.9	69	68.9	03.4	19	118.9	05.8	69	168.8	08.3	19	218.7	10.8	69	268.7	13.2
20	20.0	01.0	70	69.9	03.4	20	119.9	05.9	70	169.8	08.4	20	219.7	10.8	70	269.7	13.3
21	21.0	01.0	71	70.9	03.5	121	120.9	05.9	171	170.8	08.4	221	220.7	10.9	271	270.7	13.3
22	22.0	01.1	72	71.9	03.5	22	121.9	06.0	72	171.8	08.5	22	221.7	10.9	72	271.7	13.4
23	23.0	01.1	73	72.9	03.6	23	122.9	06.0	73	172.8	08.5	23	222.7	11.0	73	272.7	13.4
24	24.0	01.2	74	73.9	03.6	24	123.9	06.1	74	173.8	08.5	24	223.7	11.0	74	273.7	13.5
25	25.0	01.2	75	74.9	03.7	25	124.9	06.1	75	174.8	08.6	25	224.7	11.1	75	274.7	13.5
26	26.0	01.3	76	75.9	03.7	126	125.8	06.2	176	175.8	08.6	226	225.7	11.1	276	275.7	13.6
27	27.0	01.3	77	76.9	03.8	27	126.8	06.2	77	176.8	08.7	27	226.7	11.2	77	276.7	13.6
28	28.0	01.4	78	77.9	03.8	28	127.8	06.3	78	177.8	08.7	28	227.7	11.2	78	277.7	13.7
29	29.0	01.4	79	78.9	03.9	29	128.8	06.3	79	178.8	08.8	29	228.7	11.3	79	278.7	13.7
30	30.0	01.5	80	79.9	03.9	30	129.8	06.4	80	179.8	08.8	30	229.7	11.3	80	279.7	13.8
31	31.0	01.5	81	80.9	04.0	131	130.8	06.4	181	180.8	08.9	231	230.7	11.4	281	280.7	13.8
32	32.0	01.6	82	81.9	04.0	32	131.8	06.5	82	181.8	08.9	32	231.7	11.4	82	281.7	13.9
33	33.0	01.6	83	82.9	04.1	33	132.8	06.5	83	182.8	09.0	33	232.7	11.5	83	282.7	13.9
34	34.0	01.7	84	83.9	04.1	34	133.8	06.6	84	183.8	09.0	34	233.7	11.5	84	283.7	14.0
35	35.0	01.7	85	84.9	04.2	35	134.8	06.6	85	184.8	09.1	35	234.7	11.5	85	284.7	14.0
36	36.0	01.8	86	85.9	04.2	136	135.8	06.7	186	185.8	09.1	236	235.7	11.6	286	285.7	14.1
37	37.0	01.8	87	86.9	04.3	37	136.8	06.7	87	186.8	09.2	37	236.7	11.6	87	286.7	14.1
38	38.0	01.9	88	87.9	04.3	38	137.8	06.8	88	187.8	09.2	38	237.7	11.7	88	287.7	14.2
39	39.0	01.9	89	88.9	04.4	39	138.8	06.8	89	188.8	09.3	39	238.7	11.7	89	288.7	14.2
40	40.0	02.0	90	89.9	04.4	40	139.8	06.9	90	189.8	09.3	40	239.7	11.8	90	289.7	14.3
41	41.0	02.0	91	90.9	04.5	141	140.8	06.9	191	190.8	09.4	241	240.7	11.8	291	290.7	14.3
42	41.9	02.1	92	91.9	04.5	42	141.8	07.0	92	191.8	09.4	42	241.7	11.9	92	291.6	14.4
43	42.9	02.1	93	92.9	04.6	43	142.8	07.0	93	192.8	09.5	43	242.7	11.9	93	292.6	14.4
44	43.9	02.2	94	93.9	04.6	44	143.8	07.1	94	193.8	09.5	44	243.7	12.0	94	293.6	14.5
45	44.9	02.2	95	94.9	04.7	45	144.8	07.1	95	194.8	09.6	45	244.7	12.0	95	294.6	14.5
46	45.9	02.3	96	95.9	04.7	146	145.8	07.2	196	195.8	09.6	246	245.7	12.1	296	295.6	14.5
47	46.9	02.3	97	96.9	04.8	47	146.8	07.2	97	196.8	09.7	47	246.7	12.1	97	296.6	14.6
48	47.9	02.4	98	97.9	04.8	48	147.8	07.3	98	197.8	09.7	48	247.7	12.2	98	297.6	14.6
49	48.9	02.4	99	98.9	04.9	49	148.8	07.3	99	198.8	09.8	49	248.7	12.2	99	298.6	14.7
50	49.9	02.5	100	99.9	04.9	150	149.8	07.4	200	199.8	09.8	250	249.7	12.3	300	299.6	14.7
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

for 7$\frac{1}{4}$ Points.

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	01.0	00.1	51	50.8	05.0	101	100.5	09 9	151	150.3	14.8	201	200.0	19.7	251	249.8	24.6
2	02.0	00.2	52	51.8	05.1	02	101.5	10.0	52	151.3	14.9	02	201.0	19.8	52	250.8	24.7
3	03.0	00.3	53	52.7	05.2	03	102.5	10.1	53	152.3	15.0	03	202.0	19 9	53	251.8	24.8
4	04.0	00.4	54	53.7	05.3	04	103.5	10.2	54	153.3	15.1	04	203.0	20.0	54	252.8	24.9
5	05.0	00.5	55	54.7	05.4	05	104.5	10.3	55	154.3	15.2	05	204.0	20.1	55	253.8	25.0
6	06.0	00.6	56	55.7	05.5	106	105.5	10.4	156	155.3	15.3	206	205.0	20.2	256	254.8	25.1
7	07.0	00.7	57	56.7	05.6	07	106.5	10.5	57	150.2	15.4	07	206.0	20.2	57	255.8	25.2
8	08.0	00.8	58	57.7	05.7	08	107.5	10.6	58	157.2	15.5	08	207.0	20.3	58	256.8	25.3
9	09.0	00.9	59	58.7	05.8	09	108.5	10.7	59	158.2	15.6	09	208.0	20.4	59	257.8	25.4
10	10.0	01.0	60	59.7	05.9	10	109.5	10.8	60	159.2	15.7	10	209.0	20.5	60	258.8	25.5
11	10.9	01.1	61	60.7	06.0	111	110.5	10.9	161	160.2	15.7	211	210.0	20.6	261	259.7	25.6
12	11.9	01.2	62	61.7	06.1	12	111.5	11.0	62	161.2	15.8	12	211.0	20.7	62	260.7	25.7
13	12.9	01.3	63	62.7	06.2	13	112.5	11.1	63	162.2	15.9	13	212.0	20.8	63	261.7	25.8
14	13.9	01.4	64	63.7	06.3	14	113.5	11.2	64	163.2	16.0	14	213.0	20.9	64	262.7	25.9
15	14.9	01.5	65	64.7	06.4	15	114.4	11.2	65	164.2	16.1	15	214.0	21.0	65	263.7	26.0
16	15.9	01.6	66	65.7	06.5	116	115.4	11.3	166	165.2	16.2	216	215.0	21.1	266	264.7	26.1
17	16.9	01.7	67	66.7	06.6	17	116.4	11.4	67	166.2	16.3	17	216.0	21.2	67	265.7	26.2
18	17.9	01.8	68	67.7	06.7	18	117.4	11.5	68	167.2	16.4	18	217.0	21.3	68	266.7	26.3
19	18.9	01.9	69	68.7	06.7	19	118.4	11.6	69	168.2	16.5	19	217.9	21.4	69	267.7	26.4
20	19.9	02.0	70	69.7	06.8	20	119.4	11.7	70	169.2	16.6	20	218.9	21.5	70	268.7	26.5
21	20.9	02.1	71	70.7	06.9	121	120.4	11.8	171	170.2	16.7	221	219.9	21.6	271	269.7	26.6
22	21.9	02.2	72	71.7	07.0	22	121.4	11.9	72	171.2	16.8	22	220.9	21.7	72	270.7	26.7
23	22.9	02.2	73	72.6	07.1	23	122.4	12.0	73	172.2	16.9	23	221.9	21.8	73	271.7	26.8
24	23.9	02.3	74	73.6	07.2	24	123.4	12.1	74	173.2	17.0	24	222.9	21.9	74	272.7	26.9
25	24.9	02.4	75	74.6	07.3	25	124.4	12.2	75	174.2	17.1	25	223.9	22.0	75	273.7	27.0
26	25.9	02.5	76	75.6	07.4	126	125.4	12.3	176	175.2	17.2	226	224.9	22.1	276	274.7	27.1
27	26.9	02.6	77	76.6	07.5	27	126.4	12.4	77	176.2	17.3	27	225.9	22.2	77	275.7	27.2
28	27.9	02.7	78	77.6	07.6	28	127.4	12.5	78	177.1	17.4	28	226.9	22.3	78	276.7	27.3
29	28.9	02.8	79	78.6	07.7	29	128.4	12.6	79	178.1	17.5	29	227.9	22.4	79	277.7	27.4
30	29.9	02.9	80	79.6	07.8	30	129.4	12.7	80	179.1	17.6	30	228.9	22.5	80	278.7	27.5
31	30.9	03.0	81	80.6	07.9	131	130.4	12.8	181	180.1	17.7	231	229.9	22.6	281	279.6	27.6
32	31.8	03.1	82	81.6	08.0	32	131.4	12.9	82	181.1	17.8	32	230.9	22.7	82	280.6	27.7
33	32.8	03.2	83	82.6	08.1	33	132.4	13.0	83	182.1	17.9	33	231.9	22.8	83	281.6	27.8
34	33.8	03.3	84	83.6	08.2	34	133.4	13.1	84	183.1	18.0	34	232.9	22.9	84	282.6	27.9
35	34.8	03.4	85	84.6	08.3	35	134.4	13.2	85	184.1	18.1	35	233.9	23.0	85	283.6	28.0
36	35.8	03.5	86	85.6	08.4	136	135.3	13.3	186	185.1	18.2	236	234.9	23.1	286	284.6	28.1
37	36.8	03.6	87	86.6	08.5	37	136.3	13 4	87	186.1	18.3	37	235.9	23.2	87	285.6	28.2
38	37.8	03.7	88	87.6	08.6	38	137.3	13.5	88	187.1	18.4	38	236.9	23.3	88	286.6	28.3
39	38.8	03.8	89	88.6	08.7	39	138.3	13.6	89	188.1	18.5	39	237.9	23.4	89	287.6	28.4
40	39.8	03.9	90	89.6	08.8	40	139.3	13.7	90	189.1	18.6	40	238.8	23.5	90	288.6	28.5
41	40.8	04.0	91	90.6	08.9	141	140.3	13.8	191	190.1	18.7	241	239.8	23.6	291	289.6	28.6
42	41.8	04.1	92	91.6	09.0	42	141.3	13.9	92	191.1	18.8	42	240.8	23.7	92	290.6	28.7
43	42.8	04.2	93	92.6	09.1	43	142.3	14.0	93	192.1	18.9	43	241.8	23.8	93	291.6	28.8
44	43.8	04.3	94	93.5	09.2	44	143.3	14.1	94	193.1	19.0	44	242.8	23.9	94	292.6	28 9
45	44.8	04.4	95	94.5	09.3	45	144.3	14.2	95	194.1	19.1	45	243.8	24.0	95	293.6	29.0
46	45.8	04.5	96	95.5	09.4	146	145.3	14.3	196	195.1	19.2	246	244.8	24.1	296	294.6	29.1
47	46.8	04.6	97	96.5	09.5	47	146.3	14.4	97	196.1	19.3	47	245.8	24.1	97	295.6	29.2
48	47.8	04.7	98	97.5	09.6	48	147.3	14.5	98	197.0	19.4	48	246.8	24.3	98	296.6	29 2
49	48.8	04.8	99	98.5	09.7	49	148.3	14.6	99	198.0	19.5	49	247.8	24.4	99	297.6	29.3
50	49.8	04.9	100	99.5	09.8	150	149.3	14.7	200	199.0	19.6	250	248.8	24.5	300	298.6	29.4
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

for 7 ½ Points.

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	01.0	00.0	51	50.9	02,5	101	100.9	05.0	151	150.8	07.4	201	200.8	09.9	251	250.7	12.3
2	02.0	00.1	52	51.9	02.6	02	101.9	05.0	52	151.8	07.5	02	201.8	09.9	52	251.7	12.4
3	03.0	00.1	53	52.9	02.6	03	102.9	05.1	53	152.8	07.5	03	202.8	10.0	53	252.7	12.4
4	04.0	00.2	54	53.9	02.7	04	103.9	05.1	54	153.8	07.6	04	203.8	10.0	54	253.7	12.5
5	05.0	00.2	55	54.9	02.7	05	104.9	05.2	55	154.8	07.6	05	204.8	10.1	55	254.7	12.5
6	06.0	00.3	56	55.9	02.7	106	105.9	05.2	156	155.8	07.7	206	205.8	10.1	256	255.7	12.6
7	07.0	00.3	57	56.9	02.8	07	106.9	05.3	57	156.8	07.7	07	206.8	10.2	57	256.7	12.6
8	08.0	00.4	58	57.9	02.8	08	107.9	05.3	58	157.8	07.8	08	207.8	10.2	58	257.7	12.7
9	09.0	00.4	59	58.9	02.9	09	108.9	05.4	59	158.8	07.8	09	208.7	10.3	59	258.7	12.7
10	10.0	00.5	60	59.9	02.9	10	109.9	05.4	60	159.8	07.9	10	209.7	10.3	60	259.7	12.8
11	11.0	00.5	61	60.9	03.0	111	110.9	05.5	161	160.8	07.9	211	210.7	10.4	261	260.7	12.8
12	12.0	00.6	62	61.9	03.0	12	111.9	05.5	62	161.8	08.0	12	211.7	10.4	6	261.7	12.9
13	13.0	00.6	63	62.9	03.1	13	112.9	05.5	63	162.8	08.0	13	212.7	10.5	63	262.7	12.9
14	14.0	00.7	64	63.9	03.1	14	113.9	05.6	64	163.8	08.1	14	213.7	10.5	64	263.7	13.0
15	15.0	00.7	65	64.9	03.2	15	114.9	05.6	65	164.8	08.1	15	214.7	10.6	65	264.7	13.0
16	16.0	00.8	66	65.9	03.2	116	115.9	05.7	166	165.8	08.2	216	215.7	10.6	266	265.7	13.1
17	17.0	00.8	67	66.9	03.3	17	116.9	05.7	67	166.8	08.2	17	216.7	10.7	67	266.7	13.1
18	18.0	00.9	68	67.9	03.3	18	117.9	05.8	68	167.8	08.3	18	217.7	10.7	68	267.7	13.2
19	19.0	00,9	69	68.9	03.4	19	118.9	05.8	69	168.8	08.3	19	218.7	10.8	69	268.7	13.2
20	20.0	01.0	70	69.9	03.4	20	119.9	05.9	70	169.8	08.4	20	219.7	10.8	70	269.7	13.3
21	21.0	01.0	71	70.9	03.5	121	120.9	05.9	171	170.8	08.4	221	220.7	10.9	271	270.7	13.3
22	22.0	01.1	72	71.9	03.5	22	121.9	06.0	72	171.8	08.5	22	221.7	10.9	72	271.7	13.4
23	23.0	01.1	73	72.9	03.6	23	122.9	06.0	73	172.8	08.5	23	222.7	11.0	73	272.7	13.4
24	24.0	01.2	74	73.9	03.6	24	123.9	06.1	74	173.8	08.5	24	223.7	11.0	74	273.7	13.5
25	25.0	01.2	75	74.9	03.7	25	124.9	06.1	75	174.8	08.6	25	224.7	11.1	75	274.7	13.5
26	26.0	01.3	76	75.9	03.7	126	125.8	06.2	176	175.8	08.6	226	225.7	11.1	276	275.7	13.6
27	27.0	01.3	77	76.9	03.8	27	126.8	06.2	77	176.8	08.7	27	226.7	11.2	77	276.7	13.6
28	28.0	01.4	78	77.9	03.8	28	127.8	06.3	78	177.8	08.7	28	227.7	11.2	78	277.7	13.7
29	29.0	01.4	79	78.9	03.9	29	128.8	06.3	79	178.8	08.8	29	228.7	11.3	79	278.7	13.7
30	30.0	01.5	80	79.9	03.9	30	129.8	06.4	80	179.8	08.8	30	229.7	11.3	80	279.7	13.8
31	31.0	01.5	81	80.9	04.0	131	130.8	06.4	181	180.8	08.9	231	230.7	11.4	281	280.7	13.8
32	32.0	01.6	82	81.9	04.0	32	131.8	06.5	82	181.8	08.9	32	231.7	11.4	82	281.7	13.9
33	33.0	01.6	83	82.9	04.1	33	132.8	06.5	83	182.8	09.0	33	232.7	11.5	83	282.7	13.9
34	34.0	01.7	84	83.9	04.1	34	133.8	06.6	84	183.8	09.0	34	233.7	11.5	84	283.7	14.0
35	35.0	01.7	85	84.9	04.2	35	134.8	06.6	85	184.8	99.1	35	234.7	11.5	85	284.7	14.0
36	36.0	01.8	86	85.9	04.2	136	135.8	06.7	186	185.8	09.1	236	235.7	11.6	286	285.7	14.1
37	37.0	01.8	87	86.9	04.3	37	136.8	06.7	87	186.8	09.2	37	236.7	11.6	87	286.7	14.1
38	38.0	01.9	88	87.9	04.3	38	137.8	06.8	88	187.8	09.2	38	237.7	11.7	88	287.7	14.2
39	39.0	01.9	89	88.9	04.4	39	138.8	06.8	89	188.8	09.3	39	238.7	11.7	89	288.7	14.2
40	40.0	02.0	90	89.9	04.4	40	139.8	06.9	90	189.8	09.3	40	239.7	11.8	90	289.7	14.3
41	41.0	02.0	91	90.9	04.5	141	140.8	06,9	191	190.8	09.4	241	240.7	11.8	291	290.7	14.3
42	41.9	02.1	92	91.9	04.5	42	141.8	07.0	92	191.8	09.4	42	241.7	11.9	92	291.6	14.4
43	42.9	02.1	93	92.9	04.6	43	142.8	07.0	93	192.8	09.5	43	242.7	11.9	93	292.6	14.4
44	43.9	02.2	94	93.9	04.6	44	143.8	07.1	94	193.8	09.5	44	243.7	12.0	94	293.6	14.5
45	44.9	02.2	95	94.9	04.7	45	144.8	07.1	95	194.8	09.6	45	244.7	12.0	95	294.6	14.5
46	45.9	02.3	96	95.9	04.7	146	145.8	07.2	196	195.8	09.6	246	245.7	12.1	296	295.6	14.5
47	46.9	02.3	97	96.9	04.8	47	146.8	07.2	97	196.8	09.7	47	246.7	12.1	97	296.6	14.6
48	47.9	02.4	98	97.9	04.8	48	147.8	07.3	98	197.8	09.7	48	247.7	12.2	98	297.6	14.6
49	48.9	02.4	99	98.9	04.9	49	148.8	07.3	99	198.8	09.8	49	248.7	12.2	99	298.6	14.7
50	49.9	02.5	100	99.9	04.9	150	149.8	07.4	200	199.8	09.8	250	249.7	12.3	300	299.6	14.7
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	01.0	00.1	51	50.8	05.0	101	100.5	09 9	151	150.3	14.8	201	200.0	19.7	251	249.8	24.6
2	02.0	00.2	52	51.8	05.1	02	101.5	10.0	52	151.3	14.9	02	201.0	19.8	52	250.8	24.7
3	03.0	00.3	53	52.7	05.2	03	102.5	10.1	53	152.3	15.0	03	202.0	19 9	53	251.8	24.8
4	04.0	00.4	54	53.7	05.3	04	103.5	10.2	54	153.3	15.1	04	203.0	20.0	54	252.8	24.9
5	05.0	00.5	55	54.7	05.4	05	104.5	10.3	55	154.3	15.2	05	204.0	20.1	55	253.8	25.0
6	06.0	00.6	56	55.7	05.5	106	105.5	10.4	156	155.3	15.3	206	205.0	20.2	256	254.8	25.1
7	07.0	00.7	57	56.7	05.6	07	106.5	10.5	57	156.2	15.4	07	206.0	20.2	57	255.8	25.2
8	08.0	00.8	58	57.7	05.7	08	107.5	10.6	58	157.2	15.5	08	207.0	20.3	58	256.8	25.3
9	09.0	00.9	59	58.7	05.8	09	108.5	10.7	59	158.2	15.6	09	208.0	20.4	59	257.8	25.4
10	10.0	01.0	60	59.7	05.9	10	109.5	10.8	60	159.2	15.7	10	209.0	20.5	60	258.8	25.5
11	10.9	01.1	61	60.7	06.0	111	110.5	10.9	161	160.2	15.7	211	210.0	20.6	261	259.7	25.6
12	11.9	01.2	62	61.7	06.1	12	111.5	11.0	62	161.2	15.8	12	211.0	20.7	62	260.7	25.7
13	12.9	01.3	63	62.7	06.2	13	112.5	11.1	63	162.2	15.9	13	212.0	20.8	63	261.7	25.8
14	13.9	01.4	64	63.7	06.3	14	113.5	11.2	64	163.2	16.0	14	213.0	20.9	64	262.7	25.9
15	14.9	01.5	65	64.7	06.4	15	114.4	11.2	65	164.2	16.1	15	214.0	21.0	65	263.7	26.0
16	15.9	01.6	66	65.7	06.5	116	115.4	11.3	166	165.2	16.2	216	215.0	21.1	266	264.7	26.1
17	16.9	01.7	67	66.7	06.6	17	116.4	11.4	67	166.2	16.3	17	216.0	21.2	67	265.7	26.2
18	17.9	01.8	68	67.7	06.7	18	117.4	11.5	68	167.2	16.4	18	217.0	21.3	68	266.7	26.3
19	18.9	01.9	69	68.7	06.7	19	118.4	11.6	69	168.2	16.5	19	217.9	21.4	69	267.7	26.4
20	19.9	02.0	70	69.7	06.8	20	119.4	11.7	70	169.2	16.6	20	218.9	21.5	70	268.7	26.5
21	20.9	02.1	71	70.7	06.9	121	120.4	11.8	171	170.2	16.7	221	219.9	21.6	271	269.7	26.6
22	21.9	02.2	72	71.7	07.0	22	121.4	11.9	72	171.2	16.8	22	220.9	21.7	72	270.7	26.7
23	22.9	02.2	73	72.6	07.1	23	122.4	12.0	73	172.2	16.9	23	221.9	21.8	73	271.7	26.8
24	23.9	02.3	74	73.6	07.2	24	123.4	12.1	74	173.2	17.0	24	222.9	21.9	74	272.7	26.9
25	24.9	02.4	75	74.6	07.3	25	124.4	12.2	75	174.2	17.1	25	223.9	22.0	75	273.7	27.0
26	25.9	02.5	76	75.6	07.4	126	125.4	12.3	176	175.2	17.2	226	224.9	22.1	276	274.7	27.1
27	26.9	02.6	77	76.6	07.5	27	126.4	12.4	77	176.2	17.3	27	225.9	22.2	77	275.7	27.2
28	27.9	02.7	78	77.6	07.6	28	127.4	12.5	78	177.1	17.4	28	226.9	22.3	78	276.7	27.3
29	28.9	02.8	79	78.6	07.7	29	128.4	12.6	79	178.1	17.5	29	227.9	22.4	79	277.7	27.4
30	29.9	02.9	80	79.6	07.8	30	129.4	12.7	80	179.1	17.6	30	228.9	22.5	80	278.7	27.5
31	30.9	03.0	81	80.6	07.9	131	130.4	12.8	181	180.1	17.7	231	229.9	22.6	281	279.6	27.6
32	31.8	03.1	82	81.6	08.0	32	131.4	12.9	82	181.1	17.8	32	230.9	22.7	82	280.6	27.7
33	32.8	03.2	83	82.6	08.1	33	132.4	13.0	83	182.1	17.9	33	231.9	22.8	83	281.6	27.8
34	33.8	03.3	84	83.6	08.2	34	133.4	13.1	84	183.1	18.0	34	232.9	22.9	84	282.6	27.9
35	34.8	03.4	85	84.6	08.3	35	134.4	13.2	85	184.1	18.1	35	233.9	23.0	85	283.6	28.0
36	35.8	03.5	86	85.6	08.4	136	135.3	13.3	186	185.1	18.2	236	234.9	23.1	286	284.6	28.1
37	36.8	03.6	87	86.6	08.5	37	136.3	13 4	87	186.1	18.3	37	235.9	23.2	87	285.6	28.2
38	37.8	03.7	88	87.6	08.6	38	137.3	13.5	88	187.1	18.4	38	236.9	23.3	88	286.6	28.3
39	38.8	03.8	89	88.6	08.7	39	138.3	13.6	89	188.1	18.5	39	237.9	23.4	89	287.6	28.4
40	39.8	03.9	90	89.6	08.8	40	139.3	13.7	90	189.1	18.6	40	238.8	23.5	90	288.6	28.5
41	40.8	04.0	91	90.6	08.9	141	140.3	13.8	191	190.1	18.7	241	239.8	23.6	291	289.6	28.6
42	41.8	04.1	92	91.6	09.0	42	141.3	13.9	92	191.1	18.8	42	240.8	23.7	92	290.6	28.7
43	42.8	04.2	93	92.6	09.1	43	142.3	14.0	93	192.1	18.9	43	241.8	23.8	93	291.6	28.8
44	43.8	04.3	94	93.5	09.2	44	143.3	14.1	94	193.1	19.0	44	242.8	23.9	94	292.6	28 9
45	44.8	04.4	95	94.5	09.3	45	144.3	14.2	95	194.1	19.1	45	243.8	24.0	95	293.6	29.0
46	45.8	04.5	96	95.5	09.4	146	145.3	14.3	196	195.1	19.2	246	244.8	24.1	296	294.6	29.1
47	46.8	04.6	97	96.5	09.5	47	146.3	14.4	97	196.1	19.3	47	245.8	24.1	97	295.6	29.2
48	47.8	04.7	98	97.5	09.6	48	147.3	14.5	98	197.0	19.4	48	246.8	24.3	98	296.6	29 2
49	48.8	04.8	99	98.5	09.7	49	148.3	14.6	99	198.0	19.5	49	247.8	24.4	99	297.6	29.3
50	49.8	04.9	100	99.5	09.8	150	149.3	14.7	200	199.0	19.6	250	248.8	24.5	300	298.6	29.4
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

for 7 ½ Points.

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	01.0	00.1	51	50.4	07.5	101	99.9	14.8	151	149.4	22.1	201	198.8	29.5	251	248.3	36.8
2	02.0	00.3	52	51.4	07.6	02	100.9	15.0	52	150.3	22.3	02	199.8	29.6	52	249.3	37.0
3	03.0	00.4	53	52.4	07.8	03	101.9	15.1	53	151.3	22.4	03	200.8	29.8	53	250.2	37.1
4	04.0	00.6	54	53.4	07.9	04	102.9	15.3	54	152.3	22.6	04	201.8	29.9	54	251.2	37.3
5	04.9	00.7	55	54.4	08.1	05	103.9	15.4	55	153.3	22.7	05	202.8	30.1	55	252.2	37.4
6	05.9	00.9	56	55.4	08.2	106	104.8	15.5	156	154.3	22.9	206	203.8	30.2	256	253.2	37.5
7	06.9	01.0	57	56.4	08.4	07	105.8	15.7	57	155.3	23.0	07	204.7	30.4	57	254.2	37.7
8	07.9	01.2	58	57.4	08.5	08	106.8	15.8	58	156.3	23.2	08	205.7	30.5	58	255.2	37.8
9	08.9	01.3	59	58.4	08.6	09	107.8	16.0	59	157.3	23.3	09	206.7	30.6	59	256.2	38.0
10	09.9	01.5	60	59.3	08.8	10	108.8	16.1	60	158.3	23.5	10	207.7	30.8	60	257.2	38.1
11	10.9	01.6	61	60.3	08.9	111	109.8	16.3	161	159.2	23.6	211	208.7	30.9	261	258.2	38.3
12	11.9	01.8	62	61.3	09.1	12	110.8	16.4	62	160.2	23.8	12	209.7	31.1	62	259.1	38.4
13	12.9	01.9	63	62.3	09.2	13	111.8	16.6	63	161.2	23.9	13	210.7	31.2	63	260.1	38.6
14	13.8	02.1	64	63.3	09.4	14	112.8	16.7	64	162.2	24.0	14	211.7	31.4	64	261.1	38.7
15	14.8	02.2	65	64.3	09.5	15	113.7	16.9	65	163.2	24.2	15	212.7	31.5	65	262.1	38.9
16	15.8	02.3	66	65.3	09.7	116	114.7	17.0	166	164.2	24.3	216	213.7	31.7	266	263.1	39.0
17	16.8	02.5	67	66.3	09.8	17	115.7	17.2	67	165.2	24.5	17	214.6	31.8	67	264.1	39.2
18	17.8	02.6	68	67.3	10.0	18	116.7	17.3	68	166.2	24.6	18	215.6	32.0	68	265.1	39.3
19	18.8	02.8	69	68.2	10.1	19	117.7	17.5	69	167.2	24.8	19	216.6	32.1	69	266.1	39.5
20	19.8	02.9	70	69.2	10.3	20	118.7	17.6	70	168.1	24.9	20	217.6	32.3	70	267.1	39.6
21	20.8	03.1	71	70.2	10.4	121	119.7	17.7	171	169.1	25.1	221	218.6	32.4	271	268.1	39.7
22	21.8	03.2	72	71.2	10.6	22	120.7	17.9	72	170.1	25.2	22	219.6	32.6	72	269.0	39.9
23	22.7	03.4	73	72.2	10.7	23	121.7	18.0	73	171.1	25.4	23	220.6	32.7	73	270.0	40.0
24	23.7	03.5	74	73.2	10.8	24	122.7	18.2	74	172.1	25.5	24	221.6	32.8	74	271.0	40.2
25	24.7	03.7	75	74.2	11.0	25	123.6	18.3	75	173.1	25.7	25	222.6	33.0	75	272.0	40.3
26	25.7	03.8	76	75.2	11.1	126	124.6	18.5	176	174.1	25.8	226	223.5	33.1	276	273.0	40.5
27	26.7	04.0	77	76.2	11.3	27	125.6	18.6	77	175.1	26.0	27	224.5	33.3	77	274.0	40.6
28	27.7	04.1	78	77.1	11.4	28	126.6	18.8	78	176.1	26.1	28	225.5	33.4	78	275.0	40.8
29	28.7	04.3	79	78.1	11.6	29	127.6	18.9	79	177.1	26.3	29	226.5	33.6	79	276.0	40.9
30	29.7	04.4	80	79.1	11.7	30	128.6	19.1	80	178.0	26.4	30	227.5	33.7	80	277.0	41.1
31	30.7	04.5	81	80.1	11.9	131	129.6	19.2	181	179.0	26.5	231	228.5	33.9	281	277.9	41.2
32	31.7	04.7	82	81.1	12.0	32	130.6	19.4	82	180.0	26.7	32	229.5	34.0	82	278.9	41.4
33	32.6	04.8	83	82.1	12.2	33	131.6	19.5	83	181.0	26.8	33	230.5	34.2	83	279.9	41.5
34	33.6	05.0	84	83.1	12.3	34	132.5	19.6	84	182.0	27.0	34	231.5	34.3	84	280.9	41.6
35	34.6	05.1	85	84.1	12.5	35	133.5	19.8	85	183.0	27.1	35	232.4	34.5	85	281.9	41.8
36	35.6	05.3	86	85.1	12.6	136	134.5	19.9	186	184.0	27.3	236	233.4	34.6	286	282.9	41.9
37	36.6	05.4	87	86.1	12.8	37	135.5	20.1	87	185.0	27.4	37	234.4	34.8	87	283.9	42.1
38	37.6	05.6	88	87.0	12.9	38	136.5	20.2	88	186.0	27.6	38	235.4	34.9	88	284.9	42.2
39	38.6	05.7	89	88.0	13.0	39	137.5	20.4	89	186.9	27.7	39	236.4	35.0	89	285.9	42.4
40	39.6	05.9	90	89.0	13.2	40	138.5	20.5	90	187.9	27.9	40	237.4	35.2	90	286.8	42.5
41	40.6	06.0	91	90.0	13.3	141	139.5	20.7	191	188.9	28.0	241	238.4	35.3	291	287.8	42.7
42	41.5	06.2	92	91.0	13.5	42	140.5	20.8	92	189.9	28.2	42	239.4	35.5	92	288.8	42.8
43	42.5	06.3	93	92.0	13.6	43	141.4	21.0	93	190.9	28.3	43	240.4	35.6	93	289.8	43.0
44	43.5	06.5	94	93.0	13.8	44	142.4	21.1	94	191.9	28.5	44	241.3	35.8	94	290.8	43.1
45	44.5	06.6	95	94.0	13.9	45	143.4	21.3	95	192.9	28.6	45	242.3	35.9	95	291.8	43.3
46	45.5	06.7	96	95.0	14.1	146	144.4	21.4	196	193.9	28.7	246	243.3	36.1	296	292.8	43.4
47	46.5	06.9	97	95.9	14.2	47	145.4	21.6	97	194.9	28.9	47	244.3	36.2	97	293.8	43.6
48	47.5	07.0	98	96.9	14.4	48	146.4	21.7	98	195.8	29.0	48	245.3	36.4	98	294.8	43.7
49	48.5	07.2	99	97.9	14.5	49	147.4	21.8	99	196.8	29.2	49	246.3	36.5	99	295.7	43.8
50	49.5	07.3	100	98.9	14.7	150	148.4	22.0	200	197.8	29.3	250	247.3	36.7	300	296.7	44.0
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	La	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	01.0	00.2	51	50.0	10.4	101	99.1	19.7	151	148.1	29.5	201	197.1	39.2	251	246.1	49.0			
2	02.0	00.4	52	51.0	10.1	02	100.0	19.9	52	149.1	29.7	0.	198.1	39.4	52	247.1	49.2			
3	02.9	00.6	53	52.0	10.3	03	101.0	20.1	53	150.0	29.9	03	199.1	39.6	53	248.1	49.4			
4	03.9	00.8	54	53.0	10.5	04	102.0	20.3	54	151.0	30.0	04	200.1	39.8	54	249.1	49.6			
5	04.9	01.0	55	53.9	10.7	05	103.0	20.5	55	152.0	30.2	05	201.0	40.0	55	250.1	49.8			
6	05.9	01.2	56	54.9	10.9	106	104.0	20.7	156	153.0	30.4	206	202.0	40.2	256	251.1	50.0			
7	06.9	01.4	57	55.9	11.1	07	104.9	20.9	57	154.0	30.6	07	203.0	40.4	57	252.0	50.1			
8	07.8	01.6	58	56.9	11.3	08	105.9	21.1	58	154.9	30.8	08	204.0	40.6	58	253.0	50.3			
9	08.8	01.8	59	57.9	11.5	09	106.9	21.3	59	155.9	31.0	09	205.0	40.8	59	254.0	50.5			
10	09.8	02.0	60	58.8	11.7	10	107.9	21.5	60	156.9	31.2	10	205.9	41.0	60	255.0	50.7			
11	10.8	02.1	61	59.8	11.9	111	108.9	21.7	161	157.9	31.4	211	206.9	41.2	261	256.0	50.9			
12	11.8	02.3	62	60.8	12.1	12	109.8	21.9	62	158.9	31.6	12	207.9	41.4	62	256.9	51.1			
13	12.7	02.5	63	61.8	12.3	13	110.8	22.0	63	159.8	31.8	13	208.9	41.6	63	257.9	51.3			
14	13.7	02.7	64	62.8	12.5	14	111.8	22.2	64	160.8	32.0	14	209.9	41.8	64	258.9	51.5			
15	14.7	02.9	65	63.7	12.7	15	112.8	22.4	65	161.8	32.2	15	210.8	42.0	65	259.9	51.7			
16	15.7	03.1	66	64.7	12.9	116	113.8	22.6	166	162.8	32.4	216	211.8	42.1	266	260.9	51.9			
17	16.7	03.3	67	65.7	13.1	17	114.7	22.8	67	163.8	32.6	17	212.8	42.3	67	261.8	52.1			
18	17.7	03.5	68	66.7	13.3	18	115.7	23.0	68	164.7	32.8	18	213.8	42.5	68	262.8	52.3			
19	18.6	03.7	69	67.7	13.5	19	116.7	23.2	69	165.7	33.0	19	214.8	42.7	69	263.8	52.5			
20	19.6	03.9	70	68.6	13.7	20	117.7	23.4	70	166.7	33.2	20	215.7	42.9	70	264.8	52.7			
21	20.6	04.1	71	69.6	13.9	121	118.7	23.6	171	167.7	33.4	221	216.7	43.1	271	265.8	52.9			
22	21.6	04.3	72	70.6	14.0	22	119.6	23.8	72	168.7	33.6	22	217.7	43.3	72	266.7	53.1			
23	22.6	04.5	73	71.6	14.2	23	120.6	24.0	73	169.7	33.8	23	218.7	43.5	73	267.7	53.3			
24	23.5	04.7	74	72.6	14.4	24	121.6	24.2	74	170.6	34.0	24	219.7	43.7	74	268.7	53.5			
25	24.5	04.9	75	73.6	14.6	25	122.6	24.4	75	171.6	34.1	25	220.6	43.9	75	269.7	53.7			
26	25.5	05.1	76	74.5	14.8	126	123.6	24.6	176	172.6	34.3	226	221.6	44.1	276	270.7	53.9			
27	26.5	05.3	77	75.5	15.0	27	124.5	24.8	77	173.6	34.5	27	222.6	44.3	77	271.6	54.0			
28	27.5	05.5	78	76.5	15.2	28	125.5	25.0	78	174.6	34.7	28	223.6	44.5	78	272.6	54.2			
29	28.4	05.7	79	77.5	15.4	29	126.5	25.2	79	175.5	34.9	29	224.6	44.7	79	273.6	54.4			
30	29.4	05.9	80	78.5	15.6	30	127.5	25.4	80	176.5	35.1	30	225.6	44.9	80	274.6	54.6			
31	30.4	06.0	81	79.4	15.8	131	128.5	25.6	181	177.5	35.3	231	226.5	45.1	281	275.6	54.8			
32	31.4	06.2	82	80.4	16.0	32	129.5	25.8	82	178.5	35.5	32	227.5	45.3	82	276.5	55.0			
33	32.4	06.4	83	81.4	16.2	33	130.4	26.0	83	179.5	35.7	33	228.5	45.5	83	277.5	55.2			
34	33.3	06.6	84	82.4	16.4	34	131.4	26.1	84	180.4	35.9	34	229.5	45.7	84	278.5	55.4			
35	34.3	06.8	85	83.4	16.6	35	132.4	26.3	85	181.4	36.1	35	230.5	45.9	85	279.5	55.6			
36	35.3	07.0	86	84.3	16.8	136	133.4	26.5	186	182.4	36.3	236	231.4	46.0	286	280.5	55.8			
37	36.3	07.2	87	85.3	17.0	37	134.4	26.7	87	183.4	36.5	37	232.4	46.2	87	281.5	56.0			
38	37.3	07.4	88	86.3	17.2	38	135.3	26.9	88	184.4	36.7	38	233.4	46.4	88	282.4	56.2			
39	38.2	07.6	89	87.3	17.4	39	136.3	27.1	89	185.3	36.9	39	234.4	46.6	89	283.4	56.4			
40	39.2	07.8	90	88.3	17.6	40	137.3	27.3	90	186.3	37.1	40	235.4	46.8	90	284.4	56.6			
41	40.2	08.0	91	89.2	17.8	141	138.3	27.5	191	187.3	37.3	241	236.3	47.0	291	285.4	56.8			
42	41.2	08.2	92	90.2	18.0	42	139.3	27.7	92	188.3	37.5	42	237.3	47.2	92	286.4	57.0			
43	42.2	08.4	93	91.2	18.1	43	140.2	27.9	93	189.3	37.7	43	238.3	47.4	93	287.3	57.2			
44	43.2	08.6	94	92.2	18.3	44	141.2	28.1	94	190.2	37.9	44	239.3	47.6	94	288.3	57.4			
45	44.1	08.8	95	93.2	18.5	45	142.2	28.3	95	191.2	38.0	45	240.3	47.8	95	289.3	57.6			
46	45.1	09.0	96	94.1	18.7	146	143.2	28.5	196	192.2	38.2	246	241.2	48.0	296	290.3	57.8			
47	46.1	09.2	97	95.1	18.9	47	144.2	28.7	97	193.2	38.4	47	242.2	48.2	97	291.3	58.0			
48	47.1	09.4	98	96.1	19.1	48	145.1	28.9	98	194.2	38.6	48	243.2	48.4	98	292.2	58.1			
49	48.1	09.6	99	97.1	19.3	49	146.1	29.1	99	195.2	38.8	49	244.2	48.6	99	293.2	58.3			
50	49.0	09.8	100	98.1	19.5	150	147.1	29.3	200	196.1	39.0	250	245.2	48.8	300	294.2	58.5			
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat			

Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep
1	01.0	00.2	51	49.5	12.4	101	98.0	24.5	151	146.5	36.7	201	195.0	48.8	251	243.5	61.0
2	01.9	00.5	52	50.4	12.6	02	98.9	24.8	52	147.4	36.9	02	195.9	49.1	52	244.4	61.2
3	02.9	00.7	53	51.4	12.9	03	99.9	25.0	53	148.4	37.2	03	196.9	49.3	53	245.4	61.5
4	03.9	01.0	54	52.4	13.1	04	100.9	25.3	54	149.4	37.4	04	197.9	49.6	54	246.4	61.7
5	04.9	01.2	55	53.4	13.4	05	101.9	25.5	55	150.4	37.7	05	198.9	49.8	55	247.4	62.0
6	05.8	01.5	56	54.3	13.6	106	102.8	25.8	156	151.3	37.9	206	199.8	50.1	256	248.3	62.2
7	06.8	01.7	57	55.3	13.9	07	103.8	26.0	57	152.3	38..	07	200.8	50.3	57	249.3	62.5
8	07.8	01.9	58	56.3	14.1	08	104.8	26.2	58	153.3	38.4	08	201.8	50.5	58	250.3	62.7
9	08.7	02.2	59	57.2	14.3	09	105.7	26.5	59	154..	38.6	09	202.7	50.8	59	251.2	62.9
10	09.7	02.4	60	58.2	14.6	10	106.7	26.7	60	155.2	38.9	10	203.7	51.0	60	252.2	63.2
11	10.7	02.7	61	59.2	14.8	111	107.7	27.0	161	156.2	39.1	211	204.7	51.3	261	253.2	63.4
12	11.6	02.9	62	60.1	15.1	12	108.6	27.2	62	157.1	39.4	12	205.6	51.5	62	254.1	63.7
13	12.6	03.2	63	61.1	15.3	13	109.6	27.5	63	158.1	39.6	13	206.6	51.8	63	255.1	63.9
14	13.6	03.4	64	62.1	15.6	14	110.6	27.7	64	159.1	39.9	14	207.6	52.0	64	256.1	64.2
15	14.6	03.6	65	63.1	15.8	15	111.6	27.9	65	160.1	40.1	15	208.6	52.2	65	257.1	64.4
16	15.5	03.9	66	64.0	16.0	116	112.5	28.2	166	161.0	40.3	216	209.5	52.5	266	258.0	64.6
17	16.5	04.1	67	65.0	16.3	17	113.5	28.4	67	162.0	40.6	17	210.5	52.7	67	259.0	64.9
18	17.5	04.4	68	66.0	16.5	18	114.5	28.7	68	163.0	40.8	18	211.5	53.0	68	260.0	65.1
19	18.4	04.6	69	66.9	16.8	19	115.4	28.9	69	163.9	41.1	19	212.4	53.2	69	260.9	65.4
20	19.4	04.9	70	67.9	17.0	20	116.4	29.2	70	164.9	41.3	20	213.4	53.5	70	261.9	65.6
21	20.4	05.1	71	68.9	17.3	121	117.4	29.4	171	165.9	31.6	221	214.4	53 7	271	262.9	65.9
22	21.3	05.3	72	69.8	17.5	22	118.3	29.6	72	166.8	41.8	22	215.3	53.9	72	263.8	66.1
23	22.3	05.6	73	70.8	17.7	23	119.3	29.9	73	167.8	42.0	23	216.3	54.2	73	264.8	66.3
24	23.3	05.8	74	71.8	18.0	24	120.3	30.1	74	168.8	42.3	24	217.3	54.4	74	265.8	66.6
25	24.3	06.1	75	72.8	18.2	25	121.3	30.4	75	169.8	42.5	25	218.3	54.7	75	266.8	66.8
26	25.2	06.3	76	73.7	18.5	126	122.2	30.6	176	170.7	42.8	226	219.2	54.9	276	267.7	67.1
27	26.2	06.6	77	74.7	18.7	27	123.2	30.9	77	171.7	43.0	27	220.2	55.2	77	268.7	67.3
28	27.2	06.8	78	75.7	19.0	28	124.2	31.1	78	172.7	43.3	28	221.2	55.4	78	269.7	67.6
29	28.1	07.0	79	76.6	19.2	29	125.1	31.3	79	173.6	43.5	29	222.1	55.6	79	270.6	67.8
30	29.1	07.3	80	77.6	19.4	30	126.1	31.6	80	174.6	43.7	30	223.1	55.9	80	271.6	68.0
31	30.1	07.5	81	78.6	19.7	131	127.1	31.8	181	175.6	44.0	231	224.1	56.1	281	272.6	68.3
32	31.0	07.8	82	79.5	19.9	32	128.0	32.1	82	176.5	44.2	32	225.0	56.4	82	273.5	68.5
33	32.0	08.0	83	80.5	20.2	33	129.0	32.3	83	177.5	44.5	33	226.0	56.6	83	274.5	68.8
34	33.0	08.3	84	81.5	20.4	34	130.0	32.6	84	178.5	44.7	34	227.0	56.9	84	275.5	69.0
35	34.0	08.5	85	82.5	20.7	35	131.0	32.8	85	179.5	45.0	35	228.0	57.1	85	276.5	69.3
36	34.9	08.7	86	83.4	20.9	136	131.9	33.0	186	180.4	45.2	236	228.9	57.3	286	277.4	69.5
37	35.9	09.0	87	84.4	21.1	37	132.9	33.3	87	181.4	45.4	37	229.9	57.6	87	278.4	69.7
38	36.9	09.2	88	85.4	21.4	38	133.9	33.5	88	182.4	45.7	38	230.9	57.8	88	279.4	70.0
39	37.8	09.5	89	86.3	21.6	39	134.8	33.8	89	183.3	45.9	39	231.8	58.1	89	280.3	70.2
40	38.8	09.7	90	87.3	21.9	40	135.8	34.0	90	184.3	46.2	40	232.8	58.3	90	281.3	70.5
41	39.8	10.0	91	88.3	22.1	141	136.8	34.3	191	185.3	46.4	241	233.8	58.6	291	282.3	70.7
42	40.7	10.2	92	89.2	22.4	42	137.7	34.5	92	186.2	46.7	42	234.7	58 8	92	283.2	71.0
43	41.7	10.4	93	90.2	22.6	43	138.7	34.7	93	187.2	46.9	43	235.7	59.0	93	284.2	71.2
44	42.7	10.7	94	91.2	22.8	44	139.7	35.0	94	188.2	47.1	44	236.7	59.3	94	285.2	71.4
45	43.7	10 9	95	92.2	23.1	45	140.7	35.2	95	189.2	47.4	45	237.7	59.5	95	286.2	71.7
46	44.6	11.2	96	93.1	23.3	146	141.6	35.5	196	190.1	47.6	246	238.6	59.8	296	287.1	71.9
47	45.6	11.4	97	94.1	23.6	47	142.6	35.7	97	191.1	47.9	47	239.6	60.0	97	288.1	72.2
48	46.6	11.7	98	95.1	23.8	48	143.6	36.0	98	192.1	48.1	48	240.6	60.3	98	289.1	72.4
49	47.5	11.9	99	96.0	24.1	49	144.5	36.2	99	193.0	48.4	49	241.5	60.5	99	290.0	72.7
50	48.5	12.2	100	97.0	24.3	150	145.5	36.5	200	194.0	48.6	250	242.5	60.7	300	291.0	72.9
Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat

Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep
1	01.0	00.3	51	48.0	14.8	101	96.7	29.3	151	144.5	43.8	201	192.4	58.3	251	240.2	72.8
2	01.9	00.6	52	49.8	15.1	02	97.6	29.6	52	145.5	44.1	02	193.3	58.6	52	241.2	73.1
3	02.9	00.9	53	50.7	15.4	03	98.6	29.9	53	146.4	44.4	03	194.3	58.9	53	242.1	73.4
4	03.8	01.2	54	51.7	15.7	04	99.5	30.2	54	147.4	44.7	04	195.2	59.2	54	243.1	73.7
5	04.8	01.5	55	52.6	16.0	05	100.5	30.5	55	148.3	45.0	05	196.2	59.5	55	244.0	74.0
6	05.7	01.7	56	53.6	16.2	106	101.4	30.7	156	149.3	45.2	206	197.1	59.7	256	245.0	74.2
7	06.7	02.0	57	54.5	16.5	07	102.4	31.0	57	150.2	45.5	07	198.1	60.0	57	245.9	74.5
8	07.7	02.3	58	55.5	16.8	08	103.3	31.3	58	151.2	45.8	08	199.1	60.3	58	246.9	74.8
9	08.6	02.6	59	56.5	17.1	09	104.3	31.6	59	152.2	46.1	09	200.0	60.6	59	247.9	75.1
10	09.6	02.9	60	57.4	17.3	10	105.3	31.9	60	153.1	46.4	10	201.0	60.9	60	248.8	75.4
11	10.5	03.2	61	58.4	17.6	111	106.2	32.2	161	154.1	46.7	211	201.9	61.2	261	249.8	75.7
12	11.5	03.5	62	59.3	18.0	12	107.2	32.5	62	155.0	47.0	12	202.9	61.5	62	250.7	76.0
13	12.4	03.8	63	60.3	18.3	13	108.1	32.8	63	156.0	47.3	13	203.8	61.8	63	251.7	76.3
14	13.4	04.1	64	61.2	18.6	14	109.1	33.1	64	156.9	47.6	14	204.8	62.1	64	252.6	76.6
15	14.4	04.4	65	62.2	18.9	15	110.0	33.4	65	157.9	47.9	15	205.8	62.4	65	253.6	76.9
16	15.3	04.6	66	63.2	19.2	116	111.0	33.6	166	158.9	48.1	216	206.7	62.6	266	254.6	77.1
17	16.3	04.9	67	64.1	19.4	17	112.0	33.9	67	159.8	48.4	17	207.7	62.9	67	255.5	77.4
18	17.2	05.2	68	65.1	19.7	18	112.9	34.2	68	160.8	48.7	18	208.6	63.2	68	256.5	77.7
19	18.2	05.5	69	66.0	20.0	19	113.9	34.5	69	161.7	49.0	19	209.6	63.5	69	257.4	78.0
20	19.1	05.8	70	67.0	20.3	20	114.8	34.8	70	162.7	49.3	20	210.5	63.8	70	258.4	78.3
21	20.1	06.1	71	67.9	20.6	121	115.8	35.1	171	163.6	49.6	221	211.5	64.1	271	259.3	78.6
22	21.1	06.4	72	68.9	20.9	22	116.8	35.4	72	164.6	49.9	22	212.5	64.4	72	260.3	78.9
23	22.0	06.7	73	69.9	21.2	23	117.7	35.7	73	165.5	50.2	23	213.4	64.7	73	261.3	79.2
24	23.0	07.0	74	70.8	21.5	24	118.7	36.0	74	166.5	50.5	24	214.4	65.0	74	262.2	79.5
25	23.9	07.3	75	71.8	21.8	25	119.6	36.3	75	167.4	50.8	25	215.3	65.3	75	263.2	79.8
26	24.9	07.5	76	72.7	22.0	126	120.6	36.5	176	168.4	51.0	226	216.3	65.5	276	264.1	80.0
27	25.8	07.8	77	73.7	22.3	27	121.5	36.8	77	169.4	51.3	27	217.2	65.8	77	265.1	80.3
28	26.8	08.1	78	74.6	22.6	28	122.5	37.1	78	170.3	51.6	28	218.2	66.1	78	266.0	80.6
29	27.8	08.4	79	75.6	22.9	29	123.5	37.4	79	171.3	51.9	29	219.2	66.4	79	267.0	80.9
30	28.7	08.7	80	76.6	23.2	30	124.4	37.7	80	172.3	52.2	30	220.1	66.7	80	268.0	81.2
31	29.7	09.0	81	77.5	23.5	131	125.4	38.0	181	173.2	52.5	231	221.1	67.0	281	268.9	81.5
32	30.6	09.3	82	78.5	23.8	32	126.3	38.3	82	174.2	52.8	32	222.0	67.3	82	269.9	81.8
33	31.6	09.6	83	79.4	24.1	33	127.3	38.6	83	175.1	53.1	33	223.0	67.6	83	270.8	82.1
34	32.5	09.9	84	80.4	24.4	34	128.2	38.9	84	176.1	53.4	34	223.9	67.9	84	271.8	82.4
35	33.5	10.2	85	81.3	24.7	35	129.2	39.2	85	177.0	53.7	35	224.9	68.2	85	272.7	82.7
36	34.5	10.4	86	82.3	24.9	136	130.1	39.4	186	178.0	53.9	236	225.9	68.4	286	273.7	82.9
37	35.4	10.7	87	83.3	25.2	37	131.1	39.7	87	179.0	54.2	37	226.8	68.7	87	274.7	83.2
38	36.4	11.0	88	84.2	25.5	38	132.1	40.0	88	179.9	54.5	38	227.8	69.0	88	275.6	83.5
39	37.3	11.3	89	85.2	25.8	39	133.0	40.3	89	180.9	54.8	39	228.7	69.3	89	276.6	83.8
40	38.3	11.6	90	86.1	26.1	40	134.0	40.6	90	181.8	55.1	40	229.7	69.6	90	277.5	84.1
41	39.2	11.9	91	87.1	26.4	141	134.9	40.9	191	182.8	55.4	241	230.6	69.9	291	278.5	84.4
42	40.2	12.2	92	88.0	26.7	42	135.9	41.2	92	183.7	55.7	42	231.6	70.2	92	279.4	84.7
43	41.2	12.5	93	89.0	27.0	43	136.9	41.5	93	184.7	56.0	43	232.5	70.5	93	280.4	85.0
44	42.1	12.8	94	90.0	27.3	44	137.8	41.8	94	185.7	56.3	44	233.5	70.8	94	281.4	85.3
45	43.1	13.1	95	90.9	27.6	45	138.8	42.1	95	186.6	56.6	45	234.5	71.0	95	282.3	85.6
46	44.0	13.3	96	91.9	27.8	146	139.7	42.3	196	187.6	56.8	246	235.4	71.3	296	283.3	85.8
47	45.0	13.6	97	92.8	28.1	47	140.7	42.6	97	188.5	57.1	47	236.4	71.6	97	284.2	86.1
48	45.9	13.9	98	93.8	28.4	48	141.6	42.9	98	189.5	57.4	48	237.3	71.9	98	285.2	86.4
49	46.9	14.2	99	94.7	28.7	49	142.6	43.2	99	190.4	57.7	49	238.3	72.2	99	286.1	86.7
50	47.9	14.5	100	95.7	29.0	150	143.5	43.5	200	191.4	58.0	250	239.2	72.5	300	287.1	87.0
Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat

Difference of Latitude and Departure for 1¼ Deg.

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.9	00.3	51	48.0	17.2	101	95.1	34.0	151	142.2	50.9	201	189.2	67.7	251	236.3	84.5
2	01.9	00.7	52	49.0	17.5	02	96.0	34.4	52	143.1	51.2	02	190.2	63.0	52	237.3	84.9
3	02.8	01.0	53	49.9	17.8	03	97.0	34.7	53	144.0	51.5	03	191.1	63.4	53	238.2	85.2
4	03.8	01.3	54	50.8	18.2	04	97.9	35.0	54	145.0	51.9	04	192.1	68.7	54	239.1	85.5
5	04.7	01.7	55	51.8	18.5	05	98.9	35.4	55	145.9	52.2	05	193.0	69.0	55	240.1	85.9
6	05.6	02.0	56	52.7	18.9	100	99.8	35.7	156	146.9	52.5	206	194.0	69.4	256	241.0	86.2
7	06.6	02.4	57	53.7	19.2	07	100.7	36.0	57	147.8	52.9	07	194.9	69.7	57	242 0	86.6
8	07.5	02.7	58	54.6	19.5	08	101.7	36.4	58	148.8	53.2	08	195.8	70.1	58	242.9	86.9
9	08.5	03.0	59	55.5	19.9	09	102.6	36.7	59	149.7	53.6	09	196.8	70.4	59	243.8	87.2
10	09 4	03.4	60	56.5	20.2	10	103.6	37.0	60	150.6	53.9	10	197.7	70.7	60	244.8	87.6
11	10.4	03 7	61	57.4	20.5	111	104.5	37.4	161	151.6	54.2	211	198.7	71.1	261	245.7	87.9
12	11.3	04.0	62	58.4	20.9	12	105.4	37.7	62	152.5	54.6	12	199.6	71.4	62	246.7	88.2
13	12.2	04.4	63	59.3	21.2	13	106.4	38.1	63	153.5	54.9	13	200.5	71.7	63	247.6	88.6
14	13.2	04.7	64	60.3	21.6	14	107.3	38.4	64	154.4	55.2	14	201.5	72.1	64	248.6	88.9
15	14 1	05.1	65	61.2	21.9	15	108.3	38.7	65	155.3	55.6	15	202.4	72.4	65	249.5	89.2
16	15.1	05.4	66	62.1	22.2	116	109.2	39.1	166	156.3	55.9	216	203.4	72.7	266	250.4	89.6
17	16.0	05.7	67	63.1	22.6	17	110.2	39.4	67	157.2	56.2	17	204.3	73.1	67	251.4	89.9
18	17.0	06.1	68	64.0	22.9	18	111.1	39.7	68	158.2	56.6	18	205.2	73.4	68	252.3	90.3
19	17.9	06.4	69	65.0	23.2	19	112.0	40.1	69	159.1	56.9	19	206.2	73.8	69	253.3	90.6
20	18.8	06.7	70	65.9	23.6	20	113.0	40.4	70	160.1	57.3	20	207.1	74.1	70	254.2	90.9
21	19.8	07.1	71	66.8	23.9	121	113.9	40.8	171	161.0	57.6	221	208.1	74.4	271	255.1	91.3
22	20.7	07.4	72	67.8	24.2	22	114.9	41.1	72	161.9	57.9	22	209.0	74.8	72	256.1	91.6
23	21.7	07.7	73	68.7	24.6	23	115.8	41.4	73	162.9	58.3	23	210.0	75.1	73	257.0	91.9
24	22.0	08.1	74	69.7	24.9	24	116.7	41.8	74	163.8	58.6	24	210.9	75.4	74	258.0	92.3
25	23.5	08 4	75	70.6	25.3	25	117.7	42.1	75	164.8	58.9	25	211.8	75.8	75	258.9	92.6
26	24.5	08.8	76	71.6	25.6	126	118.6	42.4	176	165.7	59.3	226	212.8	76.1	276	259.9	93.0
27	25.4	09.1	77	72.5	25.9	27	119.6	42.8	77	166.6	59.6	27	213.7	76.5	77	260.8	93.3
28	26.4	09.4	78	73.4	26.3	28	120.5	43.1	78	167.6	60.0	28	214.7	76.8	78	261.7	93.6
29	27 3	09.8	79	74.4	26.6	29	121.5	43.4	79	168.5	60.3	29	215.6	77.1	79	262.7	94.0
30	28 2	10.1	80	75.3	26.9	30	122.4	43.8	80	169.5	60.6	30	216.5	77.5	80	263.6	94.3
31	29.2	10.4	81	76.3	27.3	131	123.3	44.1	181	170.4	61.0	231	217.5	77.8	281	264.6	94.6
32	30.1	10.8	82	77.2	27.6	32	124.3	44.5	82	171.4	61.3	32	218.4	78.1	82	265.5	95.0
33	31.1	11.1	83	78.1	28.0	33	125.2	44.8	83	172.3	61.6	33	219.4	78.5	83	266.4	95.3
34	32.0	11.5	84	79.1	28.3	34	126.2	45.1	84	173.2	62.0	34	220.3	78.8	84	267.4	95.6
35	33.0	11.8	85	80.0	28.6	35	127.1	45.5	85	174.2	62.3	35	221.3	79.1	85	268.3	96.0
36	33.9	12 1	86	81.0	29.0	136	128.0	45.8	186	175.1	62.6	236	222.2	79.5	286	269.3	96.3
37	34.8	12.5	87	81.9	29.3	37	129.0	46.1	87	176.1	63.0	37	223.1	79.8	87	270.2	96.7
38	35.8	12.8	88	82.9	29.6	38	129.9	46.5	88	177.0	63.3	38	224.1	80.2	88	271.2	97.0
39	36.7	13.1	89	83.8	30.0	39	130.9	46.8	89	177.9	63.7	39	225.0	80.5	89	272.1	97.3
40	37.7	13.5	90	84.7	30.3	40	131.8	47.2	90	178.9	64.0	40	226.0	80.8	90	273.0	97.7
41	38.6	13.8	91	85.7	30.6	141	132.8	47.5	191	179.8	64.3	241	226.9	81.2	291	274.0	98.0
42	39.5	14.1	92	86.6	31 0	42	133.7	47.8	92	180.8	64.7	42	227.8	81.5	92	274.9	98.3
43	40.5	14.5	93	87.6	31.3	43	134.6	48.2	93	181.7	65.0	43	228.8	81.8	93	275.9	98.7
44	41.4	14.8	94	88.5	31.7	44	135.6	48.5	94	182.6	65.3	44	229.7	82.2	94	276.8	99.0
45	42.4	15.2	95	89.4	32.0	45	136.5	48.8	95	183.6	65.7	45	230.7	82.5	95	277.7	99.4
46	43.3	15.5	96	90.4	32.3	140	137.5	49.2	196	184.5	66.0	246	231.6	82.9	296	278.7	99.7
47	44.3	15.8	97	91.3	32.7	47	138.4	49.5	97	185.5	66.3	47	232.5	83.2	97	279.6	100.0
48	45.2	16.2	98	92.3	33.0	48	139.3	49.8	98	186.4	66.7	48	233.5	83.5	98	280.6	100.4
49	46.1	16.5	99	93.2	33.3	49	140.3	50.2	99	187.4	67.0	49	234.4	83.9	99	281.5	100.7
50	47.1	16.8	100	94.2	33.7	150	141.2	50.5	200	188.3	67.4	250	235 4	84.2	300	282.5	101.0
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

for 6¼ Deg.

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.9	00.4	51	47.1	19.5	101	93.3	38.7	151	139.5	57.8	201	185.7	76.9	251	231.9	96.1
2	01.8	00.8	52	48.0	19.9	02	94.2	39.0	52	140.4	58.2	02	186.6	77.3	52	232.8	96.4
3	02.8	01.1	53	49.0	20.3	03	95.2	39.4	53	141.4	58.6	03	187.6	77.7	53	233.8	96.8
4	03.7	01.5	54	49.9	20.7	04	96.1	39.8	54	142.3	58.9	04	188.5	78.1	54	234.7	97.2
5	04.6	01.9	55	50.8	21 0	05	97.0	40.2	55	143.2	59.3	05	189.4	78.5	55	235.6	97.6
6	05.5	02.3	56	51.7	21.4	106	97.9	40.6	156	144.1	59.7	206	190.3	78.8	256	236.5	98.0
7	06.5	02.7	57	52.7	21.8	07	98.9	41.0	57	145.1	60.1	07	191.3	79.2	57	237.5	98.4
8	07.4	03.1	58	53.6	22.2	08	99.8	41.3	58	146.0	60.5	08	192.2	79.6	58	238.4	98.7
9	08.3	03.4	59	54.5	22.6	09	100.7	41.7	59	146.9	60.9	09	193.1	80.0	59	239.3	99.1
10	09.2	03.8	60	55.4	23.0	10	101.6	42.1	60	147.8	61.2	10	194.0	80.4	60	240.2	99.5
11	10.2	04.2	61	56.4	23.3	111	102.6	42.5	161	148.8	61.6	211	194.9	80.8	261	241.1	99.9
12	11.1	04.6	62	57.3	23.7	12	103.5	42.9	62	149.7	62.0	12	195.9	81.1	62	242.1	100.3
13	12.0	05.0	63	58.2	24.1	13	104.4	43.2	63	150.6	62.4	13	196.8	81.5	63	243.0	100.7
14	12.9	05.4	64	59.1	24.5	14	105.3	43.6	64	151.5	62.8	14	197.7	81.9	64	243.9	101.0
15	13.9	05.7	65	60.1	24.9	15	106.3	44.0	65	152.5	63.1	15	198.6	82.3	65	244.8	101.4
16	14.8	06.1	66	61.0	25.3	116	107.2	44.4	166	153.4	63.5	216	199.6	82.7	266	245.8	101.8
17	15.7	06.5	67	61.9	25.6	17	108.1	44.8	67	154.3	63.9	17	200.5	83.0	67	246.7	102.2
18	16.6	06.9	68	62.8	26.0	18	109.0	45.2	68	155.2	64.3	18	201.4	83.4	68	247.6	102.6
19	17.6	07.3	69	63.8	26.4	19	109.9	45.5	69	156.1	64.7	19	202.3	83.8	69	248.5	103.0
20	18.5	07.7	70	64.7	26.8	20	110.9	45.9	70	157.1	65.1	20	203.3	84.2	70	249.5	103.3
21	19.4	08.0	71	65.6	27.2	121	111.8	46.3	171	158.0	65.4	221	204.2	84.6	271	250.4	103.7
22	20.3	08.4	72	66.5	27.6	22	112.7	46.7	72	158.9	65.8	22	205.1	85.0	72	251.3	104.1
23	21.3	08.8	73	67.5	27.9	23	113.6	47.1	73	159.8	66.2	23	206.0	85.3	73	252.2	104.5
24	22.2	09.2	74	68.4	28.3	24	114.6	47.5	74	160.8	66.6	24	207.0	85.7	74	253.2	104.9
25	23.1	09.6	75	69.3	28.7	25	115.5	47.8	75	161.7	67.0	25	207.9	86.1	75	254.1	105.2
26	24.0	10.0	76	70.2	29.1	126	116.4	48.2	176	162.6	67.4	226	208.8	86.5	276	255.0	105.6
27	24.9	10.3	77	71.1	29.5	27	117.3	48.6	77	163.5	67.7	27	209.7	86.9	77	255.9	106.0
28	25.9	10.7	78	72.1	29.9	28	118.3	49.0	78	164.5	68.1	28	210.7	87.3	78	256.9	106.4
29	26.8	11.1	79	73.0	30.2	29	119.2	49.4	79	165.4	68.5	29	211.6	87.6	79	257.8	106.8
30	27.7	11.5	80	73.9	30.6	30	120.1	49.8	80	166.3	68.9	30	212.5	88.0	80	258.7	107.2
31	28.6	11.9	81	74.8	31.0	131	121.0	50.1	181	167.2	69.3	231	213.4	88.4	281	259.6	107.5
32	29.6	12.2	82	75.8	31.4	32	122.0	50.5	82	168.2	69.7	32	214.4	88.8	82	260.6	107.9
33	30.5	12.6	83	76.7	31.8	33	122.9	50.9	83	169.1	70.0	33	215.3	89.2	83	261.5	108.3
34	31.4	13.0	84	77.6	32.1	34	123.8	51.3	84	170.0	70.4	34	216.2	89.6	84	262.4	108.7
35	32.3	13.4	85	78.5	32.5	35	124.7	51.7	85	170.9	70.8	35	217.1	89.9	85	263.3	109.1
36	33.3	13.8	86	79.5	32.9	136	125.7	52.0	186	171.9	71.2	236	218.0	90.3	286	264.2	109.5
37	34.2	14.2	87	80.4	33.3	37	126.6	52.4	87	172.8	71.6	37	219.0	90.7	87	265.2	109.8
38	35.1	14.5	88	81.3	33.7	38	127.5	52.8	88	173.7	72.0	38	219.9	91.1	88	266.1	110.2
39	36.0	14.9	89	82.2	34.1	39	128.4	53.2	89	174.6	72.3	39	220.8	91.5	89	267.0	110.6
40	37.0	15.3	90	83.2	34.4	40	129.4	53.6	90	175.6	72.7	40	221.7	91.9	90	267.9	111.0
41	37.9	15.7	91	84.1	34.8	141	130.3	54.0	191	176.5	73.1	241	222.7	92.2	291	268.9	111.4
42	38.8	16.1	92	85.0	35.2	42	131.2	54.3	92	177.4	73.5	42	223.6	92.6	92	269.8	111.8
43	39.7	16.5	93	85.9	35.6	43	132.1	54.7	93	178.3	73.9	43	224.5	93.0	93	270.7	112.1
44	40.6	16.8	94	86.9	36.0	44	133.0	55.1	94	179.2	74.2	44	225.4	93.4	94	271.6	112.5
45	41.6	17.2	95	87.8	36.4	45	134.0	55.5	95	180.2	74.6	45	226.4	93.8	95	272.6	112.9
46	42.5	17.6	96	88.7	36.7	146	134.9	55.9	196	181.1	75.0	246	227.3	94.1	296	223.5	113.3
47	43.4	18.0	97	89.6	37.1	47	135.8	56.3	97	182.0	75.4	47	228.2	94.5	97	274.4	113.7
48	44.4	18.4	98	90.6	37.5	48	136.7	56.6	98	182.9	75.8	48	229.1	94.9	98	275 3	114.0
49	45.3	18.8	99	91.5	37.9	49	137.7	57.0	99	183.9	76.2	49	230.1	95.3	99	276.3	114.4
50	46.2	19.1	100	92.4	38.3	150	138.6	57.4	200	184.8	76.5	250	231.0	95.7	300	277.2	114.8
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Difference of Latitude and Departure for 2 ½ Points.

Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep
1	00.9	00.4	51	46.1	21.8	101	91.3	43....	151	136.5	64.6	201	181.7	85.9	251	226.9	107.3
2	01.8	00.9	52	47.0	22.2	02	92.2	43.6	52	137.4	65.0	02	182.6	86.4	52	227.8	107.8
3	02.7	01.3	53	47.9	22.7	03	93.1	44....	53	138.3	65.4	03	183.5	86.8	53	228.7	108.2
4	03.6	01.7	54	48.8	23.1	04	94.0	44.5	54	139.2	65.8	04	184.4	87.2	54	229.6	108.6
5	04.5	02.1	55	49.7	23.5	05	94.9	44.9	55	140.1	66.3	05	185.3	87.7	55	230.5	109.0
6	05.4	02.6	56	50.6	23.9	106	95.8	45.3	156	141.0	66.7	206	186.2	88.1	256	231.4	109.5
7	06.3	03.0	57	51.5	24.4	07	96.7	45.8	57	141.9	67.1	07	187.1	88.5	57	232.3	109.9
8	07.2	03.4	58	52.4	24.8	08	97.6	46.2	58	142.8	67.6	08	188.0	88.9	58	233.2	110.3
9	08.1	03.8	59	53.3	25.2	09	98.5	46.6	59	143.7	68.0	09	188.9	89.4	59	234.1	110.7
10	09.0	04.3	60	54.2	25.7	10	99.4	47.0	60	144.6	68.4	10	189.8	89.8	60	235.0	111.2
11	09.9	04.7	61	55.1	26.1	111	100.3	47.5	161	145.5	68.8	211	190.7	90.2	261	235.9	111.6
12	10.8	05.1	62	56 0	26.5	12	101.2	47.9	62	146.4	69.3	12	191.6	90.6	62	236.8	112.0
13	11.8	05.6	63	57.0	26.9	13	102.1	48.3	63	147.3	69.7	13	192.5	91.1	63	237.7	112.5
14	12.7	06.0	64	57.9	27.4	14	103.0	48.7	64	148.2	70 1	14	193.4	91.5	64	238.6	112.9
15	13.6	06.4	65	58.8	27.8	15	103.9	49.2	65	149.1	70.6	15	194.3	91.9	65	239.5	113.3
16	14.5	06.8	66	59.7	28.2	116	104.8	49.6	166	150.0	71.0	216	195.2	92.4	266	240.4	113.7
17	15.4	07.3	67	60.6	28.6	17	105.8	50.0	67	151.0	71.4	17	196.1	92.8	67	241.3	114.2
18	16.3	07.7	68	61.5	29.1	18	106.7	50.5	68	151.9	71.8	18	197.0	93.2	68	242.2	114.6
19	17.2	08.1	69	62.4	29.5	19	107.6	50.9	69	152.8	72.3	19	197.9	93.6	69	243.1	115.0
20	18.1	08.6	70	63.3	29.9	20	108.5	51.3	70	153.7	72.7	20	198.8	94.1	70	244.0	115.5
21	19.0	09.0	71	64.2	30.4	121	109.4	51.7	171	154.6	73.1	221	199.8	94.5	271	245.0	115.9
22	19.9	09.4	72	65.1	30.8	22	110.3	52.2	72	155.5	73.5	22	200.7	94.9	72	245.9	116.3
23	20.8	09.8	73	66.0	31.2	23	111.2	52.6	73	156.4	74.0	23	201.6	95.4	73	246.8	116.7
24	21.7	10.3	74	66.9	31.6	24	112.1	53.0	74	157.3	74.4	24	202 5	95.8	74	247.7	117.2
25	22.6	10.7	75	67.8	32.1	25	113.0	53.5	75	158.2	74.8	25	203.4	96.2	75	248.6	117.6
26	23.5	11.1	76	68.7	32.5	126	113.9	53.9	176	159.1	75.3	226	204.3	96.6	276	249.5	118.0
27	24.4	11.5	77	69.6	32 9	27	114.8	54.3	77	160.0	75.7	27	205.2	97.1	77	250.4	118.4
28	25.3	11.0	78	70.5	33.4	28	115.7	54.7	78	160.9	76.1	28	206.1	97.5	78	251.3	118.9
29	26.2	12.4	79	71.4	33..	29	116.6	55.2	79	161.8	76.5	29	207.0	97.9	79	252.2	119.3
30	27.1	12.8	80	72.3	34.2	30	117.5	55.6	80	162.7	77.0	30	207.9	98.3	80	253.1	119.7
31	28.0	13.3	81	73.2	34.6	131	118.4	56.0	181	163.6	77.4	231	208.8	98.8	281	254.0	120.2
32	28.9	13.7	82	74.1	35.1	32	119.3	56.4	82	164.5	77.8	32	209.7	99.2	82	254.9	120.6
33	29.8	14.1	83	75.0	35.5	33	120.2	56.9	83	165 4	78.2	33	210.6	99.6	83	255.8	121.0
34	30.7	14.5	84	75.9	35.9	34	121.1	57.3	84	166.3	78.7	34	211.5	100.1	84	256.7	121.4
35	31.6	15.0	85	76.8	36.3	35	122.0	57.7	85	167.2	79.1	35	212.4	100.5	85	257.6	121.9
36	32.5	15.4	86	77.7	36.8	136	122.9	58.2	186	168.1	79.5	236	213.3	100.9	286	258.5	122.3
37	33.4	15.8	87	78.6	37.2	37	123.8	58.6	87	169.0	80.0	37	214.2	101.3	87	259.4	122.7
38	34.4	16.2	88	79.6	37.6	38	124.7	59.0	88	169.9	80.4	38	215.1	101.8	88	260.3	123.1
39	35.3	16.7	89	80.5	38.1	39	125.6	59.4	89	170.8	80.8	39	216.0	102.2	89	261.2	123.6
40	36.2	17.1	90	81.4	38.5	40	126.5	59.9	90	171.7	81.2	40	216.9	102.6	90	262.1	124.0
41	37.1	17.5	91	82.3	38.9	141	127.4	60.3	191	172.6	81.7	241	217.8	103.0	291	263.0	124.4
42	38.0	18.0	92	83.2	39.4	42	128.4	60.7	92	173.6	82.1	42	218.7	103.5	92	263.9	124.9
43	38.9	18.4	93	84.1	39.8	43	129.3	61.1	93	174.5	82.5	43	219.6	103.9	93	264.8	125.3
44	39.8	18.8	94	85.0	40.2	44	130.2	61.6	94	175.4	83.0	44	220.5	104.3	94	265.7	125.7
45	40.7	19.2	95	85.9	40.6	45	131.1	62.0	95	176.3	83.4	45	221.4	104 8	95	266.6	126.1
46	41.6	19.7	96	86.8	41.0	146	132.0	62.4	196	177.2	83.8	246	222.4	105.2	296	267.6	126.6
47	42.5	20.1	97	87.7	41.5	47	132.9	62.9	97	178.1	84.2	47	223.3	105.6	97	268 5	127.0
48	43.4	20.5	98	88.6	41.9	48	133.8	63.3	98	179.0	84.7	48	224.2	106.0	98	269.4	127.4
49	44.3	21.0	99	89.5	42.3	49	134.7	63.7	99	179.9	85.1	49	225,1	106.5	99	270.3	127.8
50	45.2	21.4	100	90.4	42.8	150	135.6	64.1	200	180.8	85.5	250	226.0	106.9	300	271.2	128.3
Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat

for 5 ¾ Points.

Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep
1	00.9	00.5	51	45.0	24.0	101	89.1	47.6	151	133.2	71.1	201	177.3	94.7	251	221.4	118.3
2	01.8	00.9	52	45.9	24.5	02	90.	48.1	52	134.1	71.6	02	178.2	95.2	52	222.3	118.7
3	02.6	01.4	53	46.7	25.0	03	90.8	48.5	53	134.9	72.1	03	179.0	95.6	53	223.1	119.2
4	03.5	01.9	54	47.6	25.4	04	91.7	49.0	54	135.8	72.6	04	179.9	96.1	54	224.0	119.7
5	04.4	02.4	55	48.5	25.9	05	92.6	49.5	55	136.7	73.0	05	180.8	96.6	55	224.9	120.1
6	05.3	02.8	56	49.4	26.4	106	93.5	49.9	156	137.6	73.5	206	181.7	97.1	256	225.8	120.6
7	06.2	03.3	57	50.3	26.9	07	94.4	50.4	57	138.5	74.0	07	182.6	97.5	57	226.7	121.1
8	07.1	03.8	58	51.2	27.3	08	95.3	50.9	58	139.4	74.4	08	183.5	98.0	58	227.6	121.6
9	07.9	04.2	59	52.0	27.8	09	96.1	51.4	59	140.2	74.9	09	184.3	98.5	59	228.4	122.0
10	08.8	04.7	60	52.9	28.3	10	97.0	51.8	60	141.1	75.4	10	185.2	98.9	60	229.3	122.5
11	09.7	05.2	61	53.8	28.7	111	97.9	52.3	161	142.0	75.9	211	186.1	99.4	261	230.2	123.0
12	10.6	05.7	62	54.7	29.2	12	98.8	52.8	62	142.9	76.3	12	187.0	99.9	62	231.1	123.4
13	11.5	06.1	63	55.6	29.7	13	99.7	53.2	63	143.8	76.8	13	187.9	100.4	63	232.0	123.9
14	12.3	06.6	64	56.4	30.2	14	100.5	53.7	64	144.6	77.3	14	188.7	100.8	64	232.8	124.4
15	13.2	07.1	65	57.3	30.6	15	101.4	54.2	65	145.5	77.7	15	189.6	101.3	65	233.7	124.9
16	14.1	07.5	66	58.2	31.1	116	102.3	54.7	166	146.4	78.2	216	190.5	101.8	266	234.6	125.3
17	15.0	08.0	67	59.1	31.6	17	103.2	55.1	67	147.3	78.7	17	191.4	102.2	67	235.5	125.8
18	15.9	08.5	68	60.0	32.0	18	104.1	55.6	68	148.2	79.2	18	192.3	102.7	68	236.4	126.3
19	16.8	09.0	69	60.9	32.5	19	105.0	56.1	69	149.1	79.6	19	193.2	103.2	69	237.3	126.7
20	17.6	09.4	70	61.7	33.0	20	105.8	56.5	70	149.9	80.1	20	194.0	103.7	70	238.1	127.2
21	18.5	09.9	71	62.6	33.5	121	106.7	57.0	171	150.8	80.6	221	194.9	104.1	271	239.0	127.7
22	19.4	10.4	72	63.5	33.9	22	107.6	57.5	72	151.7	81.0	22	195.8	104.6	72	239.9	128.2
23	20.3	10.8	73	64.4	34.4	23	108.5	58.0	73	152.6	81.5	23	196.7	105.1	73	240.8	128.6
24	21.2	11.3	74	65.3	34.9	24	109.4	58.4	74	153.5	82.0	24	197.6	105.5	74	241.7	129.1
25	22.1	11.8	75	66.2	35.3	25	110.3	58.9	75	154.3	82.5	25	198.4	106.0	75	242.5	129.6
26	22.9	12.3	76	67.0	35.8	126	111.1	59.4	176	155.2	82.9	226	199.3	106.5	276	243.4	130.0
27	23.8	12.7	77	67.9	36.3	27	112.0	59.8	77	156.1	83.4	27	200.2	107.0	77	244.3	130.5
28	24.7	13.2	78	68.8	36.8	28	112.9	60.3	78	157.0	83.9	28	201.1	107.4	78	245.2	131.0
29	25.6	13.7	79	69.7	37.2	29	113.8	60.8	79	157.9	84.3	29	202.0	107.9	79	246.1	131.5
30	26.5	14.1	80	70.6	37.7	30	114.7	61.3	80	158.8	84.8	30	202.9	108.4	80	247.0	131.9
31	27.3	14.6	81	71.4	38.2	131	115.5	61.7	181	159.6	85.3	231	203.7	108.8	281	247.8	132.4
32	28.2	15.1	82	72.3	38.6	32	116.4	62.2	82	160.5	85.8	32	204.6	109.3	82	248.7	132.9
33	29.1	15.5	83	73.2	39.1	33	117.3	62.7	83	161.4	86.2	33	205.5	109.8	83	249.6	133.3
34	30.0	16.0	84	74.1	39.6	34	118.2	63.1	84	162.3	86.7	34	206.4	110.3	84	250.5	133.8
35	30.9	16.5	85	75.0	40.1	35	119.1	63.6	85	163.2	87.2	35	207.3	110.7	85	251.4	134.3
36	31.8	17.0	86	75.9	40.5	136	120.0	64.1	186	164.1	87.6	236	208.2	111.2	286	252.3	134.8
37	32.6	17.4	87	76.7	41.0	37	120.8	64.5	87	164.9	88.1	37	209.0	111.7	87	253.1	135.2
38	33.5	17.9	88	77.6	41.5	38	121.7	65.0	88	165.8	88.6	38	209.9	112.1	88	254.0	135.7
39	34.4	18.4	89	78.5	41.9	39	122.6	65.5	89	166.7	89.1	39	210.8	112.6	89	254.9	136.2
40	35.3	18.8	90	79.4	42.4	40	123.5	66.0	90	167.6	89.5	40	211.7	113.1	90	255.8	136.6
41	36.2	19.3	91	80.3	42.9	141	124.4	66.4	191	168.5	90.0	241	212.6	113.5	291	256.7	137.1
42	37.0	19.8	92	81.1	43.4	42	125.2	66.9	92	169.3	90.5	42	213.4	114.0	92	257.5	137.6
43	37.9	20.3	93	82.0	43.8	43	126.1	67.4	93	170.2	90.9	43	214.3	114.5	93	258.4	138.1
44	38.8	20.7	94	82.9	44.3	44	127.0	67.8	94	171.1	91.4	44	215.2	115.0	94	259.3	138.5
45	39.7	21.2	95	83.8	44.8	45	127.9	68.3	95	172.0	91.9	45	216.1	115.4	95	260.2	139.0
46	40.6	21.7	96	84.7	45.2	146	128.8	68.8	196	172.9	92.4	246	217.0	115.9	296	261.1	139.5
47	41.5	22.1	97	85.6	45.7	47	129.7	69.3	97	173.8	92.8	47	217.9	116.4	97	262.0	139.9
48	42.3	22.6	98	86.4	46.2	48	130.5	69.7	98	174.6	93.3	48	218.7	116.8	98	262.8	140.4
49	43.2	23.1	99	87.3	46.6	49	131.4	70.2	99	175.5	93.8	49	219.6	117.3	99	263.7	140.9
50	44.1	23.6	100	88.2	47.1	150	132.3	70.7	200	176.4	94.2	250	220.5	117.8	300	264.6	141.4
Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat

for 5 ½ Points.

Dist	Lat	Dep.	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep.
1	00.9	00.6	51	43.7	26.2	101	86.6	51.9	151	129.5	77.6	201	172.4	103.3	251	215.3	129.0
2	01.7	01.0	52	44.6	26.7	02	87.5	52.4	52	130.4	78.1	02	173.3	103.8	52	216.1	129.5
3	02.6	01.6	53	45.5	27.2	03	88.3	52.9	53	131.2	78.6	03	174.1	104.3	53	217.0	130.0
4	03.4	02.1	54	46.3	27.8	04	89.2	53.4	54	132.1	79.1	04	175.0	104.8	54	217.9	130.5
5	04.3	02.6	55	47.2	28.3	05	90.1	54.0	55	132.9	79.7	05	175.8	105.4	55	218.7	131.0
6	05.1	03.1	56	48.0	28.8	106	90.9	54.5	156	133.8	80.2	206	176.7	105.9	256	219.6	131.6
7	06.0	03.6	57	48.9	29.3	07	91.8	55.0	57	134.7	80.7	07	177.5	106.4	57	220.4	132.1
8	06.9	04.1	58	49.7	29.8	08	92.6	55.5	58	135.5	81.2	08	178.4	106.9	58	221.3	132.6
9	07.7	04.6	59	50.6	30.3	09	93.5	56.0	59	136.4	81.7	09	179.3	107.4	59	222.1	133.1
10	08.6	05.1	60	51.5	30.8	10	94.3	56.5	60	137.2	82.2	10	180.1	107.9	60	223.0	133.6
11	09.4	05.7	61	52.3	31.4	111	95.2	57.0	161	138.1	82.7	211	181.0	108.4	261	223.9	134.1
12	10.3	06.2	62	53.2	31.9	12	96.1	57.6	62	138.9	83.3	12	181.8	109.0	62	224.7	134.6
13	11.2	06.7	63	54.0	32.4	13	96.9	58.1	63	139.8	83.8	13	182.7	109.5	63	225.6	135.2
14	12.0	07.2	64	54.9	32.9	14	97.8	58.6	64	140.7	84.3	14	183.5	110.0	64	226.4	135.7
15	12.9	07.7	65	55.8	33.4	15	98.6	59.1	65	141.5	84.8	15	184.4	110.5	65	227.3	136.2
16	13.7	08.2	66	56.6	33.9	116	99.5	59.6	166	142.4	85.3	216	185.3	111.0	266	228.1	136.7
17	14.6	08.7	67	57.5	34.4	17	100.4	60.1	67	143.2	85.8	17	186.1	111.6	67	229.0	137.2
18	15.4	09.3	68	58.3	35.0	18	101.2	60.6	68	144.1	86.3	18	187.0	112.0	68	229.9	137.7
19	16.3	09.8	69	59.2	35.5	19	102.1	61.2	69	145.0	86.9	19	187.8	112.6	69	230.7	138.2
20	17.2	10.3	70	60.0	36.0	20	102.9	61.7	70	145.8	87.4	20	188.7	113.1	70	231.6	138.8
21	18.0	10.8	71	60.9	36.5	121	103.8	62.2	171	146.7	87.9	221	189.6	113.6	271	232.4	139.3
22	18.9	11.3	72	61.8	37.0	22	104.6	62.7	72	147.5	88.4	22	190.4	114.1	72	233.3	139.8
23	19.7	11.8	73	62.6	37.6	23	105.5	63.2	73	148.4	88.9	23	191.3	114.6	73	234.2	140.3
24	20.6	12.3	74	63.5	38.0	24	106.4	63.7	74	149.2	89.4	24	192.1	115.1	74	235.0	140.8
25	21.4	12.9	75	64.3	38.6	25	107.2	64.2	75	150.1	89.9	25	193.0	115.6	75	235.9	141.3
26	22.3	13.4	76	65.2	39.1	126	108.1	64.8	176	151.0	90.4	226	193.8	116.1	276	236.7	141.8
27	23.2	13.9	77	66.0	39.6	27	108.9	65.3	77	151.8	91.0	27	194.7	116.7	77	237.6	142.4
28	24.0	14.4	78	66.9	40.1	28	109.8	65.8	78	152.7	91.5	28	195.5	117.2	78	238.4	142.9
29	24.9	14.9	79	67.8	40.6	29	110.6	66.3	79	153.5	92.0	29	196.4	117.7	79	239.3	143.4
30	25.7	15.4	80	68.6	41.1	30	111.5	66.8	80	154.4	92.5	30	197.3	118.2	80	240.2	143.9
31	26.6	15.9	81	69.5	41.6	131	112.4	67.3	181	155.2	93.0	231	198.1	118.7	281	241.0	144.4
32	27.4	16.4	82	70.3	42.1	32	113.2	67.8	82	156.1	93.5	32	199.0	119.2	82	241.9	144.9
33	28.3	17.0	83	71.2	42.7	33	114.1	68.4	83	157.0	94.0	33	199.8	119.7	83	242.7	145.4
34	29.2	17.5	84	72.0	43.2	34	114.9	68.9	84	157.8	94.6	34	200.7	120.3	84	243.6	146.0
35	30.0	18.0	85	72.9	43.7	35	115.8	69.4	85	158.7	95.1	35	201.6	120.8	85	244.4	146.5
36	30.9	18.5	86	73.8	44.2	136	116.6	69.9	186	159.5	95.6	236	202.4	121.3	286	245.3	147.0
37	31.7	19.0	87	74.6	44.7	37	117.5	70.4	87	160.4	96.1	37	203.3	121.8	87	246.2	147.5
38	32.6	19.5	88	75.5	45.2	38	118.4	70.9	88	161.2	96.6	38	204.1	122.3	88	247.0	148.0
39	33.5	20.0	89	76.3	45.7	39	119.2	71.4	89	162.1	97.1	39	205.0	122.8	89	247.9	148.6
40	34.3	20.6	90	77.2	46.3	40	120.1	72.0	90	163.0	97.6	40	205.8	123.3	90	248.7	149.0
41	35.2	21.1	91	78.1	46.8	141	120.9	72.5	191	163.8	98.2	241	206.7	123.9	291	249.6	149.6
42	36.0	21.6	92	78.9	47.3	42	121.8	73.0	92	164.7	98.7	42	207.6	124.4	92	250.4	150.1
43	36.9	22.1	93	79.8	47.8	43	122.7	73.5	93	165.5	99.2	43	208.4	124.9	93	251.3	150.6
44	37.7	22.6	94	80.6	48.3	44	123.5	74.0	94	166.4	99.7	44	209.3	125.4	94	252.2	151.1
45	38.6	23.1	95	81.5	48.8	45	124.4	74.6	95	167.3	100.2	45	210.1	125.9	95	253.0	151.6
46	39.5	23.6	96	82.3	49.3	146	125.2	75.0	196	168.1	100.7	246	211.0	126.4	296	253.9	152.1
47	40.3	24.2	97	83.2	49.9	47	126.1	75.6	97	169.0	101.2	47	211.9	126.9	97	254.7	152.6
48	41.2	24.7	98	84.1	50.4	48	126.9	76.1	98	169.8	101.8	48	212.7	127.4	98	255.6	153.1
49	42.0	25.2	99	84.9	50.9	49	127.8	76.6	99	170.7	102.3	49	213.6	128.0	99	256.5	153.7
50	42.9	25.7	100	85.8	51.4	150	128.7	77.1	200	171.5	102.8	250	214.4	128.5	300	257.3	154.2
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.8	00.6	51	42.4	28.3	101	84.0	56.1	151	125.5	83.9	201	167.1	111.7	251	208.7	139.4
2	01.7	01.1	52	43.2	28.9	02	84.8	56.7	52	126.4	84.4	02	167.9	112.2	52	209.5	140.0
3	02.5	01.7	53	44.1	29.4	03	85.6	57.2	53	127.2	85.0	03	168.8	112.8	53	210.3	140.5
4	03.3	02.2	54	44.9	30.0	04	86.5	57.8	54	128.0	85.5	04	169.6	113.3	54	211.2	141.1
5	04.2	02.8	55	45.7	30.6	05	87.3	58.3	55	128.9	86.1	05	170.4	113.9	55	212.0	141.7
6	05.0	03.3	56	46.6	31.1	106	88.1	58.9	156	129.7	86.7	206	171.3	114.4	256	212.8	142.2
7	05.8	03.9	57	47.4	31.7	07	89.0	59.4	57	130.5	87.2	07	172.1	115.0	57	213.7	142.8
8	06.7	04.4	58	48.2	32.2	08	89.8	60.0	58	131.4	87.8	08	172.9	115.5	58	214.5	143.3
9	07.5	05.0	59	49.1	32.8	09	90.6	60.5	59	132 2	88.3	09	173.8	116.1	59	215.3	143.9
10	08.3	05.6	60	49.9	33.3	10	91.4	61.1	60	133.0	88.9	10	174.6	116.7	60	216.1	144.4
11	09.1	06.1	61	50.7	33.9	111	92.3	61.7	161	133.8	89.4	211	175.4	117.2	261	217.0	145.0
12	10.0	06.7	62	51.5	34.4	12	93.1	62.2	62	134.7	90.0	12	176.2	117.8	62	217.8	145.5
13	10.8	07.2	63	52.4	35.0	13	93.9	62.8	63	135.5	90.5	13	177.1	118.3	63	218.6	146.1
14	11.6	07.8	64	53.2	35.6	14	94.8	63.3	64	136.3	91.1	14	177.9	118.9	64	219.5	146.7
15	12.5	08.3	65	54.0	36.1	15	95.6	63.9	65	137.2	91.7	15	178.7	119.4	65	220.3	147.2
16	13.3	08.9	66	54.9	36.7	116	96.4	64.4	166	138.0	92.2	216	179.6	120.0	266	221.1	147.8
17	14.1	09.4	67	55.7	37.2	17	97.3	65.0	67	138.8	92.8	17	180.4	120.5	67	222.0	148.3
18	15.0	10.0	68	56.5	37 8	18	98.1	65.5	68	139.7	93.3	18	181.2	121.1	68	222.8	148.9
19	15.8	10.6	69	57.4	38.3	19	98.9	66.1	69	140.5	93.9	19	182.1	121.7	69	223.6	149.4
20	16.6	11.1	70	58.2	38.9	20	99.8	66.7	70	141.3	94.4	20	182.9	122.2	70	224.5	150.0
21	17.5	11.7	71	59.0	39.4	121	100.6	67.2	171	142.2	95.0	221	183.7	122.8	271	225.3	150.5
22	18.3	12.2	72	59.9	40.0	22	101.4	67.8	72	143.0	95.5	22	184.6	123.3	72	226.1	151.1
23	19.1	12.8	73	60,7	40.6	23	102.3	68.3	73	143.8	96.1	23	185.4	123.9	73	227.0	151.7
24	20.0	13.3	74	61.5	41.1	24	103.1	68.9	74	144.7	96.7	24	186.2	124.4	74	227.8	152.2
25	20.8	13.9	75	62.4	41.7	25	103.9	69.4	75	145.5	97.2	25	187.1	125.0	75	228.6	152.8
26	21.6	14.4	76	63.2	42.2	126	104.8	70.0	176	146.3	97.8	226	187.9	125.5	276	229.4	153.3
27	22.4	15.0	77	64.0	42.8	27	105.6	70.5	77	147.1	98.3	27	188.7	126.1	77	230.3	153.9
28	23.3	15.6	78	64.8	43.3	28	106.4	71.1	78	148.0	98.9	28	189.5	126.7	78	231.1	154.4
29	24.1	16.1	79	65.7	43.9	29	107.2	71.7	79	148.8	99.4	29	190.4	127.2	79	231.9	155.0
30	24.9	16.7	80	66.5	44.4	30	108.1	72.2	80	149.6	100.0	30	191.2	127.8	80	232.8	155.5
31	25.8	17.2	81	67.3	45.0	131	108.9	72.8	181	150.5	100.5	231	192.0	128.3	281	233.6	156.1
32	26.6	17.8	82	68.2	45.6	32	109.7	73.3	82	151.3	101.1	32	192.9	128.9	82	234.4	156.7
33	27.4	18.3	83	69.0	46.1	33	110.6	73.9	83	152.1	101.7	33	193.7	129.4	83	235.3	157.2
34	28.3	18.9	84	69.8	46.7	34	111.4	74.4	84	153.0	102.2	34	194.5	130.0	84	236.1	157.8
35	29 1	19.4	85	70.7	47.2	35	112.2	75.0	85	153.8	102.8	35	195.4	130.5	85	236.9	158.3
36	29.9	20.0	86	71.5	47.8	136	113.1	75.5	186	154.6	103.3	236	196.2	131.1	286	237.8	158.9
37	30.8	20.6	87	72.3	48.3	37	113.9	76.1	87	155.5	103.9	37	197.0	131.7	87	238.6	159.4
38	31.6	21.1	88	73.2	48.9	38	114.7	76.7	88	156.3	104.4	38	197.9	132.2	88	239.4	160.0
39	32.4	21.7	89	74.0	49.4	39	115.6	77.2	89	157.1	105.0	39	198.7	132.8	89	240.3	160.5
40	33.3	22.2	90	74.8	50.0	40	116.4	77.8	90	158.0	105.5	40	199.5	133.3	90	241.1	161.1
41	34.1	22.8	91	75.7	50.6	141	117.2	78.3	191	158.8	106.1	241	200.4	133.9	291	241.9	161.7
42	34.9	23.3	92	76.5	51.1	42	118.1	78.9	92	159.6	106.7	42	201.2	134.4	92	242.8	162.2
43	35.8	23.9	93	77.3	51.7	43	118.9	79.4	93	160.4	107.2	43	202.0	135.0	93	243.6	162.8
44	36.6	24.4	94	78.1	52.2	44	119.7	80.0	94	161.3	107.8	44	202.8	135.5	94	244.4	163.3
45	37.4	25.0	95	79.0	52.8	45	120.5	80.5	95	162.1	108.3	45	203.7	136.1	95	245.2	163.9
46	38.2	25.6	96	79.8	53.3	146	121.4	81.1	196	162.9	108.9	246	204.5	136.7	296	246.1	164.4
47	39.1	26.1	97	80.6	53.9	47	122.2	81.7	97	163.8	109.4	47	205.3	137.2	97	246.9	165.0
48	39.9	26.7	98	81.5	54.4	48	123.0	82.2	98	164.6	110.0	48	206.2	137.8	98	247.7	165.5
49	40.7	27.2	99	82.3	55.0	49	123.9	82.8	99	165.4	110.5	49	207.0	138.3	99	248.5	166.1
50	41.6	27.8	100	83.1	55.6	150	124.7	83.3	200	166.3	111.1	250	207.8	138.9	300	249.4	166.7
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Difference of Latitude and Departure for 3 ¼ Points.

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.8	00.6	51	41.0	30.4	101	81.1	60.2	151	121.3	90.0	201	161.4	119.7	251	201.6	149.5
2	01.6	01.2	52	41.8	31.0	02	81.9	60.8	52	122.1	90.6	02	162.2	120.3	52	202.4	150.1
3	02.4	01.8	53	42.6	31.6	03	82.7	61.4	53	122.9	91.1	03	163.0	120.9	53	203.2	150.7
4	03.2	02.4	54	43.4	32.2	04	83.5	62.0	54	123.7	91.7	04	163.8	121.5	54	204.0	151.3
5	04.0	03.0	55	44.2	32.8	05	84.3	62.6	55	124.5	92.3	05	164.6	122.1	55	204.8	151.9
6	04.8	03.6	56	45.0	33.4	106	85.1	63.1	156	125.3	92.9	206	165.4	122.7	256	205.6	152.5
7	05.6	04.2	57	45.8	34.0	07	85.9	63.7	57	126.1	93.5	07	166.2	123.3	57	206.4	153.1
8	06.4	04.8	58	46.6	34.6	08	86.7	64.3	58	126.9	94.1	08	167.0	123.9	58	207.2	153.7
9	07.2	05.4	59	47.4	35.1	09	87.5	64.9	59	127.7	94.7	09	167.8	124.5	59	208.0	154.3
10	08.0	06.0	60	48.2	35.7	10	88.3	65.5	60	128.5	95.3	10	168.6	125.1	60	208.8	154.9
11	08.8	06.6	61	49.0	36.3	111	89.1	66.1	161	129.3	95.9	211	169.4	125.7	261	209.6	155.5
12	09.6	07.1	62	49.8	36.9	12	89.9	66.7	62	130.1	96.5	12	170.2	126.3	62	210.4	156.1
13	10.4	07.7	63	50.6	37.5	13	90.7	67.3	63	130.9	97.1	13	171.0	126.9	63	211.2	156.7
14	11.2	08.3	64	51.4	38.1	14	91.5	67.9	61	131.7	97.7	14	171.8	127.5	62	212.0	157.3
15	12.0	08.9	65	52.2	38.7	15	92.4	68.5	65	132.5	98.3	15	172.7	128.1	65	212.8	157.9
16	12.8	09.5	66	53.0	39.3	116	93.2	69.1	166	133.3	98.9	216	173.5	128.7	266	213.6	158.5
17	13.7	10.1	67	53.8	39.9	17	94.0	69.7	67	134.1	99.5	17	174.3	129.3	67	214.4	159.1
18	14.5	10.7	68	54.6	40.5	18	94.8	70.3	68	134.9	100.1	18	175.1	129.9	68	215.2	159.7
19	15.3	11.3	69	55.4	41.1	19	95.6	70.9	69	135.7	100.7	19	175.9	130.5	69	216.0	160.3
20	16.1	11.9	70	56.2	41.7	20	96.4	71.5	70	136.5	101.3	20	176.7	131.1	70	216.8	160.9
21	16.9	12.5	71	57.0	42.3	121	97.2	72.1	171	137.3	101.9	221	177.5	131.7	271	217.6	161.4
22	17.7	13.1	72	57.8	42.9	22	98.0	72.7	72	138.1	102.5	21	178.3	132.3	72	218.4	162.0
23	18.5	13.7	73	58.6	43.5	23	98.8	73.3	73	138.9	103.1	23	179.1	132.9	73	219.2	162.6
24	19.3	14.3	74	59.4	44.1	24	99.6	73.9	74	139.7	103.7	24	179.9	133.4	74	220.0	163.2
25	20.1	14.9	75	60.2	44.7	25	100.4	74.5	75	140.5	104.3	25	180.7	134.0	75	220.8	163.8
26	20.9	15.5	76	61.0	45.3	126	101.2	75.1	176	141.3	104.9	226	181.5	134.6	276	221.7	164.4
27	21.7	16.1	77	61.8	45.9	27	102.0	75.7	77	142.1	105.4	27	182.3	135.2	77	222.4	165.0
28	22.5	16.7	78	62.6	46.5	28	102.8	76.3	78	142.9	106.0	28	183.1	135.8	78	223.2	165.6
29	23.3	17.3	79	63.4	47.1	29	103.6	76.9	79	143.7	106.6	29	183.9	136.4	79	224.0	166.2
30	24.1	17.9	80	64.2	47.7	30	104.4	77.4	80	144.5	107.2	30	184.7	137.0	80	224.8	166.8
31	24.9	18.5	81	65.0	48.3	131	105.2	78.0	181	145.4	107.8	231	185.5	137.6	281	225.6	167.4
32	25.7	19.1	82	65.8	48.9	32	106.0	78.6	82	146.2	108.4	32	186.3	138.2	82	226.4	168.0
33	26.5	19.7	83	66.6	49.5	33	106.8	79.2	83	147.0	109.0	33	187.1	138.8	83	227.2	168.6
34	27.3	20.3	84	67.4	50.0	34	107.6	79.8	84	147.8	109.6	34	187.9	139.4	84	228.0	169.2
35	28.1	20.9	85	68.2	50.6	35	108.4	80.4	85	148.6	110.2	35	188.7	140.0	85	228.8	169.8
36	28.9	21.4	86	69.0	51.2	136	109.2	81.0	186	149.4	110.8	236	189.5	140.6	286	229.7	170.4
37	29.7	22.0	87	69.8	51.8	37	110.0	81.6	87	150.2	111.4	37	190.3	141.2	87	230.5	171.0
38	30.5	22.6	88	70.7	52.4	38	110.8	82.2	88	151.0	112.0	38	191.1	141.8	88	231.3	171.6
39	31.3	23.2	89	71.5	53.0	39	111.6	82.8	89	151.8	112.6	39	191.9	142.4	89	232.1	172.2
40	32.1	23.8	90	72.3	53.6	40	112.4	83.4	90	152.6	113.2	40	192.7	143.0	90	232.9	172.8
41	32.9	24.4	91	73.1	54.2	141	113.2	84.0	191	153.4	113.8	241	193.5	143.6	291	233.7	173.4
42	33.7	25.0	92	73.9	54.8	42	114.0	84.6	92	154.2	114.4	42	194.3	144.2	92	234.5	174.0
43	34.5	25.6	93	74.7	55.4	43	114.8	85.2	93	155.0	115.0	43	195.1	144.8	93	235.3	174.6
44	35.3	26.2	94	75.5	56.0	44	115.6	85.8	94	155.8	115.6	44	195.9	145.4	94	236.1	175.1
45	36.1	26.8	95	76.3	56.6	45	116.4	86.4	95	156.6	116.2	45	196.7	146.0	95	236.9	175.7
46	36.9	27.4	96	77.1	57.2	146	117.2	87.0	196	157.4	116.8	246	197.5	146.6	296	237.7	176.3
47	37.7	28.0	97	77.9	57.8	47	118.0	87.6	97	158.2	117.4	47	198.4	147.1	97	238.5	176.9
48	38.5	28.6	98	78.7	58.4	48	118.8	88.2	98	159.0	118.0	48	199.2	147.7	98	239.3	177.5
49	39.3	29.2	99	79.5	59.0	49	119.7	88.8	99	159.8	118.6	49	200.0	148.3	99	240.1	178.1
50	40.2	29.8	100	80.3	59.6	150	120.5	89.4	200	160.6	119.1	250	200.8	148.9	300	240.9	178.7
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

D	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep
1	00.1	00.6	51	39.4	32.3	101	78.1	64.0	151	116.7	95.8	201	155.3	127.5	251	194.0	159.2
2	01.5	01.3	52	40.2	33.0	02	78.8	64.7	52	117.5	96.4	0.	156.1	128.1	52	194.7	159.8
3	02.3	01.9	53	41.0	33.6	03	79.6	65 3	53	118.2	97.0	03	156.9	128.7	53	195.5	160.4
4	03.1	02.5	54	41.7	34.2	04	80.4	66.0	54	119.0	97.7	04	157.6	129.4	54	196.3	161.1
5	03.9	03.2	55	42.5	34.9	05	81.1	66.6	55	119.8	98.3	05	158.4	130.0	55	197.1	161.7
6	04.6	03.8	56	43.3	35.5	106	81.9	67.2	156	120.6	98.9	206	159.2	130.6	256	197.8	162.3
7	05.4	04.4	57	44.1	36.1	07	82.7	67.9	57	121.3	99.6	07	160.0	131.3	57	198.6	163.0
8	06.2	05.1	58	44.8	36.8	08	83.5	68.5	58	122.1	100.2	08	160.7	131.9	58	199.4	163.6
9	07.0	05.7	59	45.6	37.4	09	84.2	69.1	59	122.9	100.8	09	161.5	132.5	59	200.1	164.2
10	07.7	06.3	60	46.4	38.0	10	85.0	69.8	60	123.6	101.5	10	162.3	133.2	60	200.9	164.9
11	08.5	07.0	61	47.1	38.7	111	85.8	70.4	161	124.4	102.1	211	163.1	133.8	261	201.7	165.5
12	09.3	07.6	62	47.9	39.3	12	86.6	71.0	62	125.2	102.7	12	163.8	134.4	62	202.5	166.1
13	10.1	08.2	63	48.7	40.0	13	87.3	71.7	63	126.0	103.4	13	164.6	135.1	63	203.2	166.8
14	10.8	08.9	64	49.5	40.6	14	88.1	72.3	64	126.7	104.0	14	165.4	135.7	64	204.0	167.4
15	11.6	09.5	65	50.2	41.2	15	88.9	72.9	65	127.5	104.6	15	166.1	136.3	65	204.8	168.0
16	12.4	10.1	66	51.0	41.9	116	89.6	73 6	166	128.3	105.3	216	166.9	137.0	266	205.6	168.7
17	13.1	10.8	67	51 8	42.5	17	90.4	74.2	67	129.1	105.9	17	167.7	137.6	67	206.3	169.3
18	13.9	11.4	68	52.6	43.1	18	91.2	74.8	68	129.8	106.5	18	168.5	138.2	68	207.1	170.0
19	14.7	12.0	69	53.3	43.8	19	92.0	75.5	69	130.6	107.2	19	169.2	138.9	69	207.9	170.6
20	15.5	12.7	70	54.1	44.4	20	92.7	76.1	70	131.4	107.8	20	170.0	139.5	70	208.6	171.2
21	16.2	13 3	71	54.	45.0	121	93.5	76.7	171	132.1	108.4	221	170.8	140.1	271	209.4	171.9
22	17.0	14.0	72	55 0	45.7	22	94.3	77.4	72	132.9	109.1	22	171.6	140.8	72	210.2	172.5
23	17.8	14.6	73	56 4	46.3	23	95.1	78.	73	133.7	109.7	23	172.3	141.4	73	211.0	173.1
24	18.5	15.2	74	57.2	46.9	24	95.8	78.6	74	134.5	110.3	24	173.1	142.0	74	211.7	173.8
25	19.3	15.9	75	58.0	47.6	25	96.6	79 3	75	135.2	111.0	25	173.9	142.7	75	212.5	174.4
26	20.1	16.5	76	58.7	48.2	126	97.4	79.9	176	136.0	111.6	226	174.0	143.3	276	213.3	175.0
27	20.9	17.1	77	59.5	48.8	27	98.1	80.5	77	136.8	112.2	27	175.4	144.0	77	214.1	175.7
28	21.6	17.8	78	60.3	49.5	28	98.9	81.2	78	137.6	112.9	28	176.2	144.6	78	214.8	176.3
29	22.4	18.4	79	61.1	50.1	29	99.7	81.8	79	138.3	113.5	29	177.0	145.2	79	215.6	176.9
30	23.2	19.0	80	61.8	50.7	30	100.4	82.4	80	139.1	114.1	30	177.7	145.9	80	216.4	177.6
31	24.0	19.7	81	62.6	51.4	131	101.2	83.1	181	139.9	114.8	231	178.5	146.5	281	217.1	178.2
32	24.7	20.3	82	63.4	52.0	32	102.0	83.7	82	140.6	115.4	32	179.3	147.1	82	217.9	178.8
33	25.5	20.9	83	64.1	52.6	33	102.8	84.3	83	141.4	116.0	33	180.1	147.8	83	218.7	179.5
34	26.3	21.6	84	64.9	53.3	34	103.6	85.0	84	142.2	116.7	34	180.8	148.4	84	219.5	180.1
35	27.1	22.2	85	65.7	53.9	35	104.3	85.6	85	143.0	117.3	35	181.6	149.0	85	220.2	180.7
36	27 8	22.8	86	66.5	54.5	136	105.1	86.2	186	143.7	118.0	236	182.4	149.7	286	221.0	181.4
37	28 6	23.5	87	67.2	55.2	37	105.9	86.9	87	144.5	118.6	37	183.1	150.3	87	221.8	182.0
38	29.4	24.1	88	68 0	55.8	38	106.6	87.5	88	145.3	119.2	38	183.9	150.9	88	222.6	182.6
39	30.1	24.7	89	68.8	56.4	39	107.4	88.1	89	146.1	119.9	39	184.7	151.6	89	223.3	183.3
40	30.9	25.4	90	69.6	57.	40	108.2	88.8	90	146.	120.	40	185.5	152.2	90	224.1	183.9
41	31.7	26.0	91	70.3	57.7	141	109.0	89.4	91	147.6	121.1	241	186.2	152.8	291	224.9	184.5
42	32.5	26.6	92	71.1	58.3	42	109.7	90.	92	148.4	121 8	42	187.0	153.5	92	225.6	185.2
43	33 2	27.3	93	71.9	59.0	43	110.5	90.7	93	149.1	122.4	43	187.8	154.1	93	226.4	185.8
44	34.0	27.9	94	72.6	59.6	44	111.3	91.	94	149.9	123 0	44	188.6	154.7	94	227.2	186.4
45	34.8	28.5	95	73.4	60.2	45	112.1	92.	95	150.7	123.7	45	189.3	155.4	95	228.0	187.1
46	35.5	29.2	96	74.2	60.9	146	112.8	92.6	196	151.5	124.3	246	190.1	156.0	296	228.7	187.7
47	36.3	29.8	97	75.0	61.5	47	113 6	93.2	97	152.2	124.9	47	190.9	156.6	97	229.5	188.3
48	37.1	30.4	98	75.7	62.1	48	114.4	93.	98	153.0	125.6	48	191.6	157.3	98	230.3	189.0
49	37.9	31.1	99	76.5	62.8	49	115.1	94.5	99	153.8	126.2	49	192.4	157.9	99	231.1	189.6
50	38 7	31.7	100	77.3	63.4	150	115.9	95.1	200	154.6	126.8	250	193.2	158.5	300	231.8	190.2
Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	La:	Diff	Dep	Lat

for 4 ½ Points.

Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep	Dist	Lat	Dep
1	00.7	00.7	51	37.8	34.2	101	74.8	67.8	151	111.9	101.4	201	148.9	135.0	251	185.9	168.5
2	01.5	01.3	52	38.5	34.9	02	75.6	68.5	52	112.6	102.1	02	149.6	135.6	52	186.7	169.2
3	02.2	02.0	53	39.3	35.6	03	76.3	69.2	53	113.3	102.7	03	150.4	136.3	53	187.4	169.9
4	03.0	02.7	54	40.0	36.3	04	77.0	69.8	54	114.1	103.4	04	151.1	137.0	54	188.2	170.5
5	03.7	03.4	55	40.7	36.9	05	77.8	70.5	55	114.8	104.1	05	151.9	137.6	55	188.9	171.2
6	04.4	04.0	56	41.5	37.6	106	78.5	71.2	156	115.6	104.7	206	152.6	138.3	256	189.6	171.9
7	05.2	04.7	57	42.2	38.3	07	79.3	71.8	57	116.3	105.4	07	153.3	139.0	57	190.4	172.6
8	05.9	05.4	58	43.0	38.9	08	80.0	72.5	58	117.0	106.1	08	154.1	139.7	58	191.1	173.2
9	06.7	06.0	59	43.7	39.6	09	80.7	73.2	59	117.8	106.8	09	154.8	140.3	59	191.9	173.9
10	07.4	06.7	60	44.4	40.3	10	81.5	73.9	60	118.5	107.4	10	155.6	141.0	60	192.6	174.6
11	08.2	07.4	61	45.2	41.0	111	82.2	74.5	161	119.3	108.1	211	156.3	141.7	261	193.3	175.2
12	08.9	08.1	62	45.9	41.6	12	83.0	75.2	62	120.0	108.8	12	157.0	142.3	62	194.1	175.9
13	09.6	08.7	63	46.7	42.3	13	83.7	75.9	63	120.7	109.4	13	157.8	143.0	63	194.8	176.6
14	10.4	09.4	64	47.4	43.0	14	84.4	76.5	64	121.5	110.1	14	158.5	143.7	64	195.6	177.3
15	11.1	10.1	65	48.2	43.6	15	85.2	77.2	65	122.2	110.8	15	159.3	144.4	65	196.3	177.9
16	11.9	10.7	66	48.9	44.3	116	85.9	77.9	166	123.0	111.5	216	160.0	145.0	266	197.0	178.6
17	12.6	11.4	67	49.6	45.0	17	86.7	78.6	67	123.7	112.1	17	160.7	145.7	67	197.8	179.3
18	13.3	12.1	68	50.4	45.7	18	87.4	79.2	68	124.4	112.8	18	161.5	146.4	68	198.5	179.9
19	14.1	12.8	69	51.1	46.3	19	88.2	79.9	69	125.2	113.5	19	162.2	147.0	69	199.3	180.6
20	14.8	13.4	70	51.9	47.0	20	88.9	80.6	70	125.9	114.1	20	163.0	147.7	70	200.0	181.3
21	15.6	14.1	71	52.6	47.7	121	89.6	81.2	171	126.7	114.8	221	163.7	148.4	271	200.7	182.0
22	16.3	14.8	72	53.3	48.3	22	90.4	81.9	72	127.4	115.5	22	164.4	149.1	72	201.5	182.6
23	17.0	15.4	73	54.1	49.0	23	91.1	82.6	73	128.2	116.2	23	165.2	149.7	73	202.2	183.3
24	17.8	15.1	74	54.8	49.7	24	91.9	83.3	74	128.9	116.8	24	165.9	150.4	74	203.0	184.0
25	18.5	16.8	75	55.6	50.4	25	92.6	83.9	175	129.6	117.5	25	166.7	151.1	75	203.7	184.6
26	19.3	17.5	76	56.3	51.0	126	93.3	84.6	176	130.4	118.2	226	167.4	151.7	276	204.4	185.3
27	20.0	18.1	77	57.0	51.7	27	94.1	85.3	77	131.1	118.8	27	168.2	152.4	77	205.2	186.0
28	20.7	18.8	78	57.8	52.4	28	94.8	85.9	78	131.9	119.5	28	168.9	153.1	78	205.9	186.7
29	21.5	19.5	79	58.5	53.0	29	95.6	86.6	79	132.6	120.2	29	169.6	153.8	79	206.7	187.3
30	22.2	20.1	80	59.3	53.7	30	96.3	87.3	80	133.3	120.9	30	170.4	154.4	80	207.4	188.0
31	23.0	20.8	81	60.0	54.4	131	97.0	88.0	181	134.1	121.5	231	171.1	155.1	281	208.2	188.7
32	23.7	21.5	82	60.7	55.1	32	97.8	88.6	82	134.8	122.2	32	171.9	155.8	82	208.9	189.3
33	24.4	22.2	83	61.5	55.7	33	98.5	89.3	83	135.6	122.9	33	172.6	156.4	83	209.6	190.0
34	25.2	22.8	84	62.2	56.4	34	99.3	90.0	84	136.3	123.5	34	173.3	157.1	84	210.4	190.7
35	25.9	23.5	85	63.0	57.1	35	100.0	90.6	85	137.0	124.2	35	174.1	157.8	85	211.1	191.4
36	26.7	24.2	86	63.7	57.7	136	100.7	91.3	186	137.8	124.9	236	174.8	158.5	286	211.9	192.0
37	27.4	24.8	87	64.4	58.4	37	101.5	92.0	87	138.5	125.6	37	175.6	159.1	87	212.6	192.7
38	28.2	25.5	88	65.2	59.1	38	102.2	92.7	88	139.3	126.2	38	176.3	159.8	88	213.3	193.4
39	28.9	26.2	89	65.9	59.8	39	103.0	93.3	89	140.0	126.9	39	177.0	160.5	89	214.1	194.0
40	29.6	26.9	90	66.7	60.4	40	103.7	94.0	90	140.7	127.6	40	177.8	161.1	90	114.8	194.7
41	30.4	27.5	91	67.4	61.1	141	104.4	94.7	191	141.5	128.2	241	178.5	161.8	291	215.6	195.4
42	31.1	28.2	92	68.2	61.8	42	105.2	95.3	92	142.2	128.9	42	179.3	162.5	92	216.3	196.1
43	31.9	28.9	93	68.9	62.4	43	105.9	96.0	93	143.0	129.6	43	180.0	163.2	93	217.0	196.7
44	32.6	29.5	94	69.6	63.1	44	106.7	96.7	94	143.7	130 3	44	180.7	163.8	94	217.8	197.4
45	33.3	30.2	95	70.4	63.8	45	107.4	97.4	95	144.4	130.9	45	181.5	164.5	95	218.5	198.1
46	34.1	30.9	96	71.1	64.5	146	108.2	98.0	196	145.2	131.6	246	182.2	165.2	296	219.3	198.7
47	34.8	31.6	97	71.9	65.1	47	108.9	98.7	97	145.9	132.3	47	183.0	165.8	97	220.0	199.4
48	35.6	32.2	98	72.6	65.8	48	109.6	99.4	98	146.7	132.9	48	183.7	166.5	98	220.7	200.1
49	36.3	32.9	99	73.3	66.5	49	110.4	100.0	99	147.4	133.6	49	184.4	167.2	99	221.5	200.8
50	37.0	33.6	100	74.1	67.1	150	111.1	100.7	200	148.2	134.3	250	185.2	167.8	300	222.2	201.4
Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat	Dist	Dep	Lat

Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep	Diff	Lat	Dep
1	00.7	00.7	51	36.1	36.1	101	71.4	71.4	151	106.8	106.8	201	142.1	142.1	251	177.5	177.5
2	01.4	01.4	52	36.8	36.8	02	72.1	72.1	52	107.5	107.5	02	142.8	142.8	52	178.2	178.2
3	02.1	02.1	53	37.5	37.5	03	72.8	72.8	53	108.2	108.2	03	143.5	143.5	53	178.9	178.9
4	02.8	02.8	54	38.2	38.2	04	73.5	73.5	54	108.9	108.9	04	144.2	144.2	54	179.6	179.6
5	03.5	03.5	55	38.9	38.9	05	74.2	74.2	55	109.6	109.6	05	144.9	144.9	55	180.3	180.3
6	04.2	04.2	56	39.6	39.6	106	74.9	74.9	156	110.3	110.3	206	145.7	145.7	256	181.0	181.0
7	04.9	04.9	57	40.3	40.3	07	75.7	75.7	57	111.0	111.0	07	146.4	146.4	57	181.7	181.7
8	05.7	05.7	58	41.0	41.0	08	76.4	76.4	58	111.7	111.7	08	147.1	147.1	58	182.4	182.4
9	06.4	06.4	59	41.7	41.7	09	77.1	77.1	59	112.4	112.4	09	147.8	147.8	59	183.1	183.1
10	07.1	07.1	60	42.4	42.4	10	77.8	77.8	60	113.1	113.1	10	148.5	148.5	60	183.8	183.8
11	07.8	07.8	61	43.1	43.1	111	78.5	78.5	161	113.8	113.8	211	149.2	149.2	261	184.5	184.5
12	08.5	08.5	62	43.8	43.8	12	79.2	79.2	62	114.5	114.5	12	149.9	149.9	62	185.3	185.3
13	09.2	09.2	63	44.5	44.5	13	79.9	79.9	63	115.3	115.3	13	150.6	150.6	63	186.0	186.0
14	09.9	09.9	64	45.3	45.3	14	80.6	80.6	64	116.0	116.0	14	151.3	151.3	64	186.7	186.7
15	10.6	10.6	65	46.0	46.0	15	81.3	81.3	65	116.7	116.7	15	152.0	152.0	65	187.4	187.4
16	11.3	11.3	66	46.7	46.7	116	82.0	82.0	166	117.4	117.4	216	152.7	152.7	266	188.1	188.1
17	12.0	12.0	67	47.4	47.4	17	82.7	82.7	67	118.1	118.1	17	153.4	153.4	67	188.8	188.8
18	12.7	12.7	68	48.1	48.1	18	83.4	83.4	68	118.8	118.8	18	154.1	154.1	68	189.5	189.5
19	13.4	13.4	69	48.8	48.8	19	84.1	84.1	69	119.5	119.5	19	154.8	154.8	69	190.2	190.2
20	14.1	14.1	70	49.5	49.5	20	84.8	84.8	70	120.2	120.2	20	155.6	155.6	70	190.9	190.9
21	14.8	14.8	71	50.2	50.2	121	85.6	85.6	171	120.9	120.9	221	156.3	156.3	271	191.6	191.6
22	15.6	15.6	72	50.9	50.9	22	86.3	86.3	72	121.6	121.6	22	157.0	157.0	72	192.3	192.3
23	16.3	16.3	73	51.6	51.6	23	87.0	87.0	73	122.3	122.3	23	157.7	157.7	73	193.0	193.0
24	17.0	17.0	74	52.3	51.3	24	87.7	87.7	74	123.0	123.0	24	158.4	158.4	74	193.7	193.7
25	17.7	17.7	75	53.0	53.0	25	88.4	88.4	75	123.7	123.7	25	159.1	159.1	75	194.4	194.4
26	18.4	18.4	76	53.7	53.7	126	89.1	89.1	176	124.4	124.4	226	159.8	159.8	276	195.2	195.2
27	19.1	19.1	77	54.4	54.4	27	89.8	89.8	77	125.2	125.2	27	160.5	160.5	77	195.9	195.9
28	19.8	19.8	78	55.2	55.2	28	90.5	90.5	78	125.9	125.9	28	161.2	161.2	78	196.6	196.6
29	20.5	20.5	79	55.9	55.9	29	91.2	91.2	79	126.6	126.6	29	161.9	161.9	79	197.3	197.3
30	21.2	21.2	80	56.6	56.6	30	91.9	91.9	80	127.3	127.3	30	162.6	162.6	80	198.0	198.0
31	21.9	21.9	81	57.3	57.3	131	92.6	92.6	181	128.0	128.0	231	163.3	163.3	281	198.7	198.7
32	22.6	22.6	82	58.0	58.0	32	93.3	93.3	82	128.7	128.7	32	164.0	164.0	82	199.4	199.4
33	23.3	23.3	83	58.7	58.7	33	94.0	94.0	83	129.4	129.4	33	164.7	164.7	83	200.1	200.1
34	24.0	24.0	84	59.4	59.4	34	94.7	94.7	84	130.1	130.1	34	165.5	165.5	84	200.8	200.8
35	24.7	24.7	85	60.1	60.1	35	95.5	95.5	85	130.8	130.8	35	166.2	166.2	85	201.5	201.5
36	25.5	25.5	86	60.8	60.8	136	96.2	96.2	186	131.5	131.5	236	166.9	166.9	286	202.2	202.2
37	26.2	26.2	87	61.5	61.5	37	96.9	96.9	87	132.2	132.2	37	167.6	167.6	87	202.9	202.9
38	26.9	26.9	88	62.2	62.2	38	97.6	97.6	88	132.9	132.9	38	168.3	168.3	88	203.6	203.6
39	27.6	27.6	89	62.9	62.9	39	98.3	98.3	89	133.6	133.6	39	169.0	169.0	89	204.3	204.3
40	28.3	28.3	90	63.6	63.6	40	99.0	99.0	90	134.3	134.3	40	169.7	169.7	90	205.1	205.1
41	29.0	29.0	91	64.3	64.3	141	99.7	99.7	191	135.1	135.1	241	170.4	170.4	291	205.8	205.8
42	29.7	29.7	92	65.1	65.1	42	100.4	100.4	92	135.8	135.8	42	171.1	171.1	92	206.5	206.5
43	30.4	30.4	93	65.8	65.8	43	101.1	101.1	93	136.5	136.5	43	171.8	171.8	93	207.2	207.2
44	31.1	31.1	94	66.5	66.5	44	101.8	101.8	94	137.2	137.2	44	172.5	172.5	94	207.9	207.9
45	31.8	31.8	95	67.2	67.2	45	102.5	102.5	95	137.9	137.9	45	173.2	173.2	95	208.6	208.6
46	32.5	32.5	96	67.9	67.9	146	103.2	103.2	196	138.6	138.6	246	173.9	173.9	296	209.3	209.3
47	33.2	33.2	97	68.6	68.6	47	103.9	103.9	97	139.3	139.3	47	174.6	174.6	97	210.0	210.0
48	33.9	33.9	98	69.3	69.3	48	104.6	104.6	98	140.0	140.0	48	175.4	175.4	98	210.7	210.7
49	34.6	34.6	99	70.0	70.0	49	105.4	105.4	99	140.7	140.7	49	176.1	176.1	99	211.4	211.4
50	35.4	35.4	100	70.7	70.7	150	106.1	106.1	200	141.4	141.4	250	176.8	176.8	300	212.1	212.1
Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat	Diff	Dep	Lat

A TABLE of Numbers for the readier finding the Time of High-Water on any Day.

Month Days	Year 1762. January	February	March	April	May	June	July	August	September	October	November	December
1	15	17	16	17	18	19	20	21	22	23	25	25
2	16	18	17	18	19	20	21	22	23	24	26	26
3	17	19	18	19	20	21	22	23	24	25	27	27
4	18	20	19	20	21	22	23	24	25	26	28	28
5	19	21	20	21	22	23	24	25	26	27	29	29
6	20	22	21	22	23	24	25	26	27	28	30	30
7	21	23	22	23	24	25	26	27	28	29	31	31
8	22	24	23	24	25	26	27	28	29	30	32	32
9	23	25	24	25	26	27	28	29	30	31	33	33
10	24	26	25	26	27	28	29	30	31	32	34	34
11	25	27	26	27	28	29	30	31	32	33	35	35
12	26	28	27	28	29	30	31	32	33	34	36	36
13	27	29	28	29	30	31	32	33	34	35	37	37
14	28	30	29	30	31	32	33	34	35	36	38	38
15	29	31	30	31	32	33	34	35	36	37	39	39
16	30	32	31	32	33	34	35	36	37	38	40	40
17	31	33	32	33	34	35	36	37	38	39	11	11
18	32	34	33	34	35	36	37	38	39	40	12	12
19	33	35	34	35	36	37	38	39	40	11	13	13
20	34	36	35	36	37	38	39	40	11	12	14	14
21	35	37	36	37	38	39	40	11	12	13	15	15
22	36	38	37	38	39	40	11	12	13	14	16	16
23	37	39	38	39	40	11	12	13	14	15	17	17
24	38	40	39	40	11	12	13	14	15	16	18	18
25	39	11	40	11	12	13	14	15	16	17	19	19
26	40	12	11	12	13	14	15	16	17	18	20	20
27	11	13	12	13	14	15	16	17	18	19	21	21
28	12	14	13	14	15	16	17	18	19	20	22	22
29	13		14	15	16	17	18	19	20	21	23	23
30	14		15	16	17	18	19	20	21	22	24	24
31	15		16		18		20	21		23		25

Month Days	Year 1763. January	February	March	April	May	June	July	August	September	October	November	December
1	26	28	27	28	29	30	31	32	34	34	36	36
2	27	29	28	29	30	31	32	33	35	35	37	37
3	28	30	29	30	31	32	33	34	36	36	38	38
4	29	31	30	31	32	33	34	35	37	37	39	39
5	30	32	31	32	33	34	35	36	38	38	40	40
6	31	33	32	33	34	35	36	37	39	39	11	11
7	32	34	33	34	35	36	37	38	40	40	12	12
8	33	35	34	35	36	37	38	39	11	11	13	13
9	34	36	35	36	37	38	39	40	12	12	14	14
10	35	37	36	37	38	39	40	11	13	13	15	15
11	36	38	37	38	39	40	11	12	14	14	16	16
12	37	39	38	39	40	11	12	13	15	15	17	17
13	38	40	39	40	11	12	13	14	16	16	18	18
14	39	11	40	11	12	13	14	15	17	17	19	19
15	40	12	11	12	13	14	15	16	18	18	20	20
16	11	13	12	13	14	15	16	17	19	19	21	21
17	12	14	13	14	15	16	17	18	20	20	22	22
18	13	15	14	15	16	17	18	19	21	21	23	23
19	14	16	15	16	17	18	19	20	22	22	24	24
20	15	17	16	17	18	19	20	21	23	23	25	25
21	16	18	17	18	19	20	21	22	24	24	26	26
22	17	19	18	19	20	21	22	23	25	25	27	27
23	18	20	19	20	21	22	23	24	26	26	28	28
24	19	21	20	21	22	23	24	25	27	27	29	29
25	20	22	21	22	23	24	25	26	28	28	30	30
26	21	23	22	23	24	25	26	27	29	29	31	31
27	22	24	23	24	25	26	27	28	30	30	32	32
28	23	25	24	25	26	27	28	29	31	31	33	33
29	24		25	26	27	28	29	30	32	32	34	34
30	25		26	27	28	29	30	31	33	33	35	35
31	26		27		29		31	32		34		36

A TABLE of Numbers for the readier finding the Time of High-Water on any Day.

Year 1764.

Month Days	January	February	March	April	May	June	July	August	September	October	November	December
1	37	39	38	39	40	11	12	13	15	16	17	17
2	38	40	39	40	11	12	13	14	16	17	18	18
3	39	11	40	11	12	13	14	15	17	18	19	19
4	40	12	11	12	13	14	15	16	18	19	20	20
5	11	13	12	13	14	15	16	17	19	20	21	21
6	12	14	13	14	15	16	17	18	20	21	22	22
7	13	15	14	15	16	17	18	19	21	22	23	23
8	14	16	15	16	17	18	19	20	22	23	24	24
9	15	17	16	17	18	19	20	21	23	24	25	25
10	16	18	17	18	19	20	21	22	24	25	26	26
11	17	19	18	19	20	21	22	23	25	26	27	27
12	18	20	19	20	21	22	23	24	26	27	28	28
13	19	21	20	21	22	23	24	25	27	28	29	29
14	20	22	21	22	23	24	25	26	28	29	30	30
15	21	23	22	23	24	25	26	27	29	30	31	31
16	22	24	23	24	25	26	27	28	30	31	32	32
17	23	25	24	25	26	27	28	29	31	32	33	33
18	24	26	25	26	27	28	29	30	32	33	34	34
19	25	27	26	27	28	29	30	31	33	34	35	35
20	26	28	27	28	29	30	31	32	34	35	36	36
21	27	29	28	29	30	31	32	33	35	36	37	37
22	28	30	29	30	31	32	33	34	36	37	38	38
23	29	31	30	31	32	33	34	35	37	38	39	39
24	30	32	31	32	33	34	35	36	38	39	40	40
25	31	33	32	33	34	35	36	37	39	40	11	11
26	32	34	33	34	35	36	37	38	40	11	12	12
27	33	35	34	35	36	37	38	39	11	12	13	13
28	34	36	35	36	37	38	39	40	12	13	14	14
29	35	37	36	37	38	39	40	11	13	14	15	15
30	36		37	38	39	40	11	12	14	15	16	16
31	37		38		40		12	13		16		17

Year 1765.

Month Days	January	February	March	April	May	June	July	August	September	October	November	December
1	18	20	19	20	21	22	23	24	26	26	28	28
2	19	21	20	21	22	23	24	25	27	27	29	29
3	20	22	21	22	23	24	25	26	28	28	30	30
4	21	23	22	23	24	25	26	27	29	29	31	31
5	22	24	23	24	25	26	27	28	30	30	32	32
6	23	25	24	25	26	27	28	29	31	31	33	33
7	24	26	25	26	27	28	29	30	32	32	34	34
8	25	27	26	27	28	29	30	31	33	33	35	35
9	26	28	27	28	29	30	31	32	34	34	36	36
10	27	29	28	29	30	31	32	33	35	35	37	37
11	28	30	29	30	31	32	33	34	36	36	38	38
12	29	31	30	31	32	33	34	35	37	37	39	39
13	30	32	31	32	33	34	35	36	38	38	40	40
14	31	33	32	33	34	35	36	37	39	39	11	11
15	32	34	33	34	35	36	37	38	40	40	12	12
16	33	35	34	35	36	37	38	39	11	11	13	13
17	34	36	35	36	37	38	39	40	12	12	14	14
18	35	37	36	37	38	39	40	11	13	13	15	15
19	36	38	37	38	39	40	11	12	14	14	16	16
20	37	39	38	39	40	11	12	13	15	15	17	17
21	38	40	39	40	11	12	13	14	16	16	18	18
22	39	11	40	11	12	13	14	15	17	17	19	19
23	40	12	11	12	13	14	15	16	18	18	20	20
24	11	13	12	13	14	15	16	17	19	19	21	21
25	12	14	13	14	15	16	17	18	20	20	22	22
26	13	15	14	15	16	17	18	19	21	21	23	23
27	14	16	15	16	17	18	19	20	22	22	24	24
28	15	17	16	17	18	19	20	21	23	23	25	25
29	16		17	18	19	20	21	22	24	24	26	26
30	17		18	19	20	21	22	23	25	25	27	27
31	18		19		21		23	24		26		28

A TABLE of Numbers for the readier finding the Time of High-Water on any Day.

Month Days	Year 1766.											
	January	February	March	April	May	June	July	August	September	October	November	December
1	29	31	30	31	32	33	34	35	37	37	39	39
2	30	32	31	32	33	34	35	36	38	38	40	40
3	31	33	32	33	34	35	36	37	39	39	11	11
4	32	34	35	34	35	36	37	38	40	40	12	12
5	33	35	34	35	36	37	38	39	11	11	13	13
6	34	36	35	36	37	38	39	40	12	12	14	14
7	35	37	36	37	38	39	40	11	13	13	15	15
8	36	38	37	38	39	40	11	12	14	14	16	16
9	37	39	38	39	40	11	12	13	15	15	17	17
10	38	40	39	40	11	12	13	14	16	16	18	18
11	39	11	40	11	12	13	14	15	17	17	19	19
12	40	12	11	12	13	14	15	16	18	18	20	20
13	11	13	12	13	14	15	16	17	19	19	21	21
14	12	14	13	14	15	16	17	18	20	20	22	22
15	13	15	14	15	16	17	18	19	21	21	23	23
16	14	16	15	16	17	18	19	20	22	22	24	24
17	15	17	16	17	18	19	20	21	23	23	25	25
18	16	18	17	18	19	20	21	22	24	24	26	26
19	17	19	18	19	20	21	22	23	25	25	27	27
20	18	20	19	20	21	22	23	24	26	26	28	28
21	19	21	20	21	22	23	24	25	27	27	29	29
22	20	22	21	22	23	24	25	26	28	28	30	30
23	21	23	22	23	24	25	26	27	29	29	31	31
24	22	24	23	24	25	26	27	28	30	30	32	32
25	23	25	24	25	26	27	28	29	31	31	33	33
26	24	26	25	26	27	28	29	30	32	32	34	34
27	25	27	26	27	28	29	30	31	33	33	35	35
28	26	28	27	28	29	30	31	32	34	34	36	36
29	27		28	29	30	31	32	33	35	35	37	37
30	28		29	30	31	32	33	34	36	36	38	38
31	29		30		32		34	35		37		39

Month Days	Year 1767.											
	January	February	March	April	May	June	July	August	September	October	November	December
1	11	13	12	13	14	15	16	17	19	19	21	21
2	12	14	13	14	15	16	17	18	20	20	22	22
3	13	15	14	15	16	17	18	19	21	21	23	23
4	14	16	15	16	17	18	19	20	22	22	24	24
5	15	17	16	17	18	19	20	21	23	23	25	25
6	16	18	17	18	19	20	21	22	24	24	26	26
7	17	19	18	19	20	21	22	23	25	25	27	27
8	18	20	19	20	21	22	23	24	26	26	28	28
9	19	21	20	21	22	23	24	25	27	27	29	29
10	20	22	21	22	23	24	25	26	28	28	30	30
11	21	23	22	23	24	25	26	27	29	29	31	31
12	22	24	23	24	25	26	27	28	30	30	32	32
13	23	25	24	25	26	27	28	29	31	31	33	33
14	24	26	25	26	27	28	29	30	32	32	34	34
15	25	27	26	27	28	29	30	31	33	33	35	35
16	26	28	27	28	29	30	31	32	34	34	36	36
17	27	29	28	29	30	31	32	33	35	35	37	37
18	28	30	29	30	31	32	33	34	36	36	38	38
19	29	31	30	31	32	33	34	35	37	37	39	39
20	30	32	31	32	33	34	35	36	38	38	40	40
21	31	33	32	33	34	35	36	37	39	39	11	11
22	32	34	33	34	35	36	37	38	40	40	12	12
23	33	35	34	35	36	37	38	39	11	11	13	13
24	34	36	35	36	37	38	39	40	12	12	14	14
25	35	37	36	37	38	39	40	11	13	13	15	15
26	36	38	37	38	39	40	11	12	14	14	16	16
27	37	39	38	39	40	11	12	13	15	15	17	17
28	38	40	39	40	11	12	13	14	16	16	18	18
29	39		40	11	12	13	14	15	17	17	19	19
30	40		11	12	13	14	15	16	18	18	20	20
31	11		12		14		16	17		19		21

A TABLE of Numbers for the readier finding the Time of High-Water on any Day,

Month Days	Year 1768. January	February	March	April	May	June	July	Auguſt	September	October	November	December
1	22	24	23	24	25	26	27	28	30	30	32	32
2	23	25	24	25	26	27	28	29	31	31	33	33
3	24	26	25	26	27	28	29	30	32	32	34	34
4	25	27	26	27	28	29	30	31	33	33	35	35
5	26	28	27	28	29	30	31	32	34	34	36	36
6	27	29	28	29	30	31	32	33	35	35	37	37
7	28	30	29	30	31	32	33	34	36	36	38	38
8	29	31	30	31	32	33	34	35	37	37	39	39
9	30	32	31	32	33	34	35	36	38	38	40	40
10	31	33	32	33	34	35	36	37	39	39	11	11
11	32	34	33	34	35	36	37	38	40	40	12	12
12	33	35	34	35	36	37	38	39	11	11	13	13
13	34	36	35	36	37	38	39	40	12	12	14	14
14	35	37	36	37	38	39	40	11	13	13	15	15
15	36	38	37	38	39	40	11	12	14	14	16	16
16	37	39	38	39	40	11	12	13	15	15	17	17
17	38	40	39	40	11	12	13	14	16	16	18	18
18	39	11	40	11	12	13	14	15	17	17	19	19
19	40	12	11	12	13	14	15	16	18	18	20	20
20	11	13	12	13	14	15	16	17	19	19	21	21
21	12	14	13	14	15	16	17	18	20	20	22	22
22	13	15	14	15	16	17	18	19	21	21	23	23
23	14	16	15	16	17	18	19	20	22	22	24	24
24	15	17	16	17	18	19	20	21	23	23	25	25
25	16	18	17	18	19	20	21	22	24	24	26	26
26	17	19	18	19	20	21	22	23	25	25	27	27
27	18	20	19	20	21	22	23	24	26	26	28	28
28	19	21	20	21	22	23	24	25	27	27	29	29
29	20	22	21	22	23	24	25	26	28	28	30	30
30	21		22	23	24	25	26	27	29	29	31	31
31	22		23		25		27	28		30		32

Month Days	Year 1769. January	February	March	April	May	June	July	Auguſt	September	October	November	December
1	33	35	34	35	36	37	38	39	11	11	13	13
2	34	36	35	36	37	38	39	40	12	12	14	14
3	35	37	36	37	38	39	40	11	13	13	15	15
4	36	38	37	38	39	40	11	12	14	14	16	16
5	37	39	38	39	40	11	12	13	15	15	17	17
6	38	40	39	40	11	12	13	14	16	16	18	18
7	39	11	40	11	12	13	14	15	17	17	19	19
8	40	12	11	12	13	14	15	16	18	18	20	20
9	11	13	12	13	14	15	16	17	19	19	21	21
10	12	14	13	14	15	16	17	18	20	20	22	22
11	13	15	14	15	16	17	18	19	21	21	23	23
12	14	16	15	16	17	18	19	20	22	22	24	24
13	15	17	16	17	18	19	20	21	23	23	25	25
14	16	18	17	18	19	20	21	22	24	24	26	26
15	17	19	18	19	20	21	22	23	25	25	27	27
16	18	20	19	20	21	22	23	24	26	26	28	28
17	19	21	20	21	22	23	24	25	27	27	29	29
18	20	22	21	22	23	24	25	26	28	28	30	30
19	21	23	22	23	24	25	26	27	29	29	31	31
20	22	24	23	24	25	26	27	28	30	30	32	32
21	23	25	24	25	26	27	28	29	31	31	33	33
22	24	26	25	26	27	28	29	30	32	32	34	34
23	25	27	26	27	28	29	30	31	33	33	35	35
24	26	28	27	28	29	30	31	32	34	34	36	36
25	27	29	28	29	30	31	32	33	35	35	37	37
26	28	30	29	30	31	32	33	34	36	36	38	38
27	29	31	30	31	32	33	34	35	37	37	39	39
28	30	32	31	32	33	34	35	36	38	38	40	40
29	31		32	33	34	35	36	37	39	39	11	11
30	32		33	34	35	36	37	38	40	40	12	12
31	33		34		36		38	39		11		13

A TABLE of Numbers, &c.

Year 1770.

Month Days	January	February	March	April	May	June	July	August	September	October	November	December
1	14	16	15	16	17	18	19	20	22	22	24	24
2	15	17	16	17	18	19	20	21	23	23	25	25
3	16	18	17	18	19	20	21	22	24	24	26	26
4	17	19	18	19	20	21	22	23	25	25	27	27
5	18	20	19	20	21	22	23	24	26	26	28	28
6	19	21	20	21	22	23	24	25	27	27	29	29
7	20	22	21	22	23	24	25	26	28	28	30	30
8	21	23	22	23	24	25	26	27	29	29	31	31
9	22	24	23	24	25	26	27	28	30	30	32	32
10	23	25	24	25	26	27	28	29	31	31	33	33
11	24	26	25	26	27	28	29	30	32	32	34	34
12	25	27	26	27	28	29	30	31	33	33	35	35
13	26	28	27	28	29	30	31	32	34	34	36	36
14	27	29	28	29	30	31	32	33	35	35	37	37
15	28	30	29	30	31	32	33	34	36	36	38	38
16	29	31	30	31	32	33	34	35	37	37	39	39
17	30	32	31	32	33	34	35	36	38	38	40	40
18	31	33	32	33	34	35	36	37	39	39	11	11
19	32	34	33	34	35	36	37	38	40	40	12	12
20	33	35	34	35	36	37	38	39	11	11	13	13
21	34	36	35	36	37	38	39	40	12	12	14	14
22	35	37	36	37	38	39	40	11	13	13	15	15
23	36	38	37	38	39	40	11	12	14	14	16	16
24	37	39	38	39	40	11	12	13	15	15	17	17
25	38	40	39	40	11	12	13	14	16	16	18	18
26	39	11	40	11	12	13	14	15	17	17	19	19
27	40	12	11	12	13	14	15	16	18	18	20	20
28	11	13	12	13	14	15	16	17	19	19	21	21
29	12		13	14	15	16	17	18	20	20	22	22
30	13		14	15	16	17	18	19	21	21	23	23
31	14		15		17		19	20		22		24

A TABLE answering to any of the foregoing Numbers.

Numbers	Times answering. H. M.	
11	0 — 48	Afternoon
12	1 — 36	
13	2 — 24	
14	3 — 12	
15	4 — 00	
16	4 — 48	
17	5 — 36	
18	6 — 24	
19	7 — 12	
20	8 — 00	
21	8 — 48	
22	9 — 36	
23	10 — 24	
24	11 — 12	
25	12 — 00	
26	0 — 48	After Midnight
27	1 — 36	
28	2 — 24	
29	3 — 12	
30	4 — 00	
31	4 — 48	
32	5 — 36	
33	6 — 24	
34	7 — 12	
35	8 — 00	
36	8 — 48	
37	9 — 36	
38	10 — 24	
39	11 — 12	
40	12 — 00	

The Uſe of the foregoing Tables *of* Numbers.

IN theſe Tables, each Page is divided into two Parts, by a double Line drawn down the Middle; and each of the Parts are marked at the Top with the Year for which they ſhew the Numbers, and under that, the Left-hand Column of each Part is marked with the Days of the Month, and the other Columns with the Months of the Year: So that if you would know the Number for any Day, ſuppoſe for Example, on the 12*th* of *March*, 1764.

Firſt, Find the given Year 1764 at the Top of the Table, and then under the given Month, which is *March*, and right againſt the given Day of the Month (which in this Caſe is 12) you will find the Number 19, which is the Number for that Day; and if from the Number ſo found you ſubtract 10, the Remainder will be the Moon's Age for that Day.

The Uſe of the Table of the Times anſwering to the foregoing Numbers.

In this Table the Left-hand Column is mark'd with the given Numbers from 11 to 40, and the Figures right againſt any of theſe Numbers, gives the Time anſwering to it, in Hours and Minutes.

EXAMPLE I.

I would known what Time anſwers to the Number 23 *?*

Anſwer. 10 Hours 24 Minutes Afternoon, that is, at 24 Minutes paſt Ten at Night.

EXAMPLE II.

What Number and Time anſwers to the 8*th of* January, 1766.

Firſt, by the Tables of Numbers, I find the Number to be 36, and againſt that Number, in the Table of Times, I find 8 Hours 48 Minutes after Midnight, that is, 48 Minutes paſt Eight in the Morning.

A

A.	H	M
At *Army* —— —— ——	01	03
At *Amſterdam* & *Armentie*	03	00
At *Abarwark* —— ——	04	30
At *Abermorick* & *Antwerk*	06	00
At *Aldborough* —— ——	09	45
B.		
At *Beachy*, *Blacktail*, and before the Race of *Blanquet*	12	00
Thwart of *Beachy* ——	12	45
At *Blackneſs*, in *Bluet*, and at *Bell-Iſle* —— —— ——	01	30
Without *Bluet* and at *Berwick* —— —— —— ——	02	15
Bourdeaux River, the South Coaſt of *Bretaigne*, the Coaſt of *Biſcay*, and at *Bockneſs* —	03	00
At *Breſt*, before the *Baſe*, and the River of *Bourdeaux* within the Haven ——	03	45
In *Breeſound*, *Bloy* and *Baltimore* —— —— ——	04	30
Before *Bremen* and at *Blackney*, and in the Channel before *Bourdeaux* —— ——	06	00
At *Briſtol* Key —— ——	06	45
At *Bridgewater* —— ——	07	30
Bullen Deep —— ——	10	30
C.		
In *Condado* —— ——	12	00
In the Chamber of *Rye*	00	45
Without *Calis*, at *Corpus Chriſti* Point; and at *Camfer*	01	30
Between *Calis*, and *Dover*, before *Conquet*, and at the North Cape —— ——	03	00

	H	M
At *Cork*, *Calis*, Cape *Clear*, and in the Creek —— ——	40	30
At *Caldy* & *Comarthen* Bay	05	15
At *Concalo* —— ——	06	00
Without the *Caſkets* ——	08	15
Between the *Caſkets* and *Guernſey*, before *Cromer* at *Seven Cliffs*, and at *Catneſs* —	09	00
At the *Caſkets* and *Chamberneſs* —— —— ——	09	45
At *Cows*, in the Foſs of *Caen*, in *Calice* and *Chamberneſs* Roads —— —— ——	10	30
Before the Haven of *Caen*, in the *Chamber*, between *Cripple-Sand* and the *Croyle*, and at *Calſhot* —— ——	11	15
D.		
At *Dover* Pier, and before *Dunkirk* —— —— ——	12	00
At *Denbeigh* & *Downs* Road	02	15
At *Dort* —— ——	03	00
At *Dungarven* —— ——	04	30
At *Dartmouth* —— ——	06	00
At *Dublin* —— ——	08	15
At *Dunbar* —— ——	09	00
At *Dungeneſs* and *Dunnoſe*	09	45
At *Dover*, *Diepe* and *Deal*	10	30
E.		
At *Emden*, before the *Elve*, before the *Eyder*, and before *Enchuſen* —— —— ——	12	00
At *Edam* —— ——	01	30
Before the Eaſtern & Weſtern *Emes*, and at *Engomonts*	09	00

On

F.	H	M
On the Coaſt of *Flanders*	12	00
At *Fluſhing* —— ——	00	45
Before the *Fen* in the Channel —— —— ——	01	30
Without *Fountny* ——	02	15
Without the Banks of *Flanders* —— —— ——	03	00
At *Flamborough* and *Bridlington* —— —— —— ——	04	30
At the *Forn*, in *Foy* at *Falmouth* —— —— ——	05	15
Between *Foy* & *Falmouth* in the Channel, and at *Foulneſs*	06	45
Before the Coaſt of *Friezland* and the *Fly* —— ——	07	30
Without the *Fly* —— ——	08	15
At *Frieze* and *Fair Iſle* —	09	00
At the *Frith* and South *Foreland* —— —— ——	10	30
In *Fair Iſle* Road, and at the North *Foreland* ——	11	15

G.		
In *Gibralter* Road, at *Graveling*, and before *Cherburg*	12	00
Before *Goree*, at *Guernſey*, and at *Graveſend* —— ——	01	30
At *Groine*, at *Gaſcoign*, & the Coaſt of *Galicia* ——	03	00
Thwart of *Guernſey* ——	09	45
In the *Chamber*, & *Goree-end* —— —— —— ——	11	15

H.		
Before the *Hever*, before *Hern*, and at *Hampton-Key* —	12	00
Under *Holy* Iſland, & at *Horn*	01	30
Before *Hartlepoole* ——	03	00
At *Huntcliff-Foot* ——	03	45
At *Humber* —— ——	05	15
Before *Hamborough*, at *Hull*, at the *Holmes*, and before *Humbers* Mouth —— ——	06	00
At *Harlem*, *Havre de Grace* and *Home-head* —— ——	09	00
At. St. *Hellens*, at *Harwich* and without the Banks of *Harwich* —— —— ——	10	30
At *Harwich* within ——	11	15

I.		
At *Jutland* Iſlands ——	12	00
On the W. Coaſt of *Ireland*	03	00
In all the Havens on the South Coaſt of *Ireland* ——	05	15

K.		
Kentiſh Knock —— ——	12	00
At *Kelliers* —— ——	03	00
At *Kingſale* —— ——	04	30
At *Kylduyn* —— ——	07	30
At *Kildive* —— ——	09	00

L.		
At *Leith* —— ——	12	00
At *Liſbon* —— ——	02	15
At *London* —— ——	03	00
Thwart of *Londey* and before *Lynn* —— —— ——	05	15
At *Lynn* half Tide, at *Londey* —— —— ——	06	00
At *Lynn* —— —— —	06	45

	H	M
At the *Lizard* by the Land	07	30
At *Lambay* —— ——	08	5
At *Leyſtoff*, and thwart off it without the Banks ——	09	45
In *Leyſtoff* Road, and at *Long Sand-Head* —— ——	0	3

M.

Within the *Maes* at *Maldon* —— —— —— ——	00	45
Before the *Maes* ——	0	30
At the *Maes* and before St. *Matthew*'s Point ——	03	45
In *Mouſe-hole*, at St. *Matthew*'s, & within *Mount*'s-*Bay*	04	30
In *Milford*, at *Moonleſs* & at St. *Maloes* —— —— ——	05	15
Between *Mouſe-Hole* and *Falmouth* & in *Milford-Haven*	07	30
In St. *Magnes* Sound and *Magnes* Caſtle —— ——	08	5
At the *Iſle of Man* ——	09	00
Before *Margate* —— ——	11	5

N.

At *Newport* Half Tide —	12	00
At the Weſt-end of the *Nore* —— —— —— ——	00	45
Before *Nantz* River ——	03	00
At *Newcaſtle* —— ——	05	15
Before St. *Nicholas* ——	06	45
At the *Needles*, at the *Iſle of Wight* —— —— ——	08	15
All the Coaſt of *Normandy* and *Picardy* —— —— ——	10	30
Between the *Naze* and *Warhead* of *Lower* —— ——	11	15

O.

At *Orkneſs* —— —— ——	03	00
At *Orkney* —— —— ——	09	00
At *Orfordneſs* —— ——	09	45
At *Orfordneſs* without the Banks, and between *Orford* and *Orwell Waves* —— ——	0	30
At *Orfordneſs* within the Sands —— —— ——	11	5

P.

At *Portſmouth* half Tide	11	15
At the *Pens*, *Porthus* and *Poictu* —— —— ——	03	00
On the Coaſt of *Portugal*	03	45
In *Plymouth*, and before St. *Paul's* —— —— ——	05	5
In the Haven at St. *Paul's*	06	00
Before *Podeſſemeck* ——	06	45
Thwart of *Plymouth* ——	07	30
At the Race of *Portland*	09	00

Q.

At *Quinbrough* —— ——	12	00

R.

At *Rocheſter* —— ——	00	45
At *Ramkins* —— ——	01	30
At *Rotterdam*, in *Robinhood*'s Bay, and from the *Race* to the *Pole-Head* ——	03	00
At *Rouen*, & before *Rochell*	03	45
In *Ramſey* —— ——	05	5

S.

In the *Sleeve*, between *Uſhant* and *Scilly*, at the *Shoe*, at the *Spitts*, at *Southampton*, and along the *Swin* ——	12	00

Upon

	H	M
Upon the Coaſt of *Spain*, and in *Shetland*	03	00
At *Scilly*, in the *Sound*, *Scarburgh*, and at *Staples*	03	45
At *Seven Iſles*, without the Haven in the *Broad-Sound*	04	30
At the Mouth of *Severn*, between *Scilly* and the *Lizard*, at the *Spurn* and *Stockton*	05	15
Without *Scilly*, in the Channel, and at *Salcomb*	06	00
At *Sedmouth*, & at the *Start*	06	45
Off the *Start* in the Channel	07	30
Within the *Seyn* & before *Shelburgh*	09	00
At *Shoreham*	09	45
At *Seyn-Head*	0	30
T.		
Within *Tervere*	00	45
Before *Tervere*, before the *Thames* and at *Tinmouth*	01	30
Before the *Tees* & *Tinmouth* before the Bay of *Tinmouth*	03	00
At the Clifts of the *Texell*	04	30
In *Torbay*, and before the *Texell*	06	00
In the Road of the *Texell*	07	30
At *Torgen*	09	45
U.		
Before *Ureck*	12	00
At *Uſe*	03	00
Between *Uſhant* & the Main	03	45
In the *Vourd*, at the Bay, within *Uſhant*	04	30
Without *Uſhant*	06	00
St. *Vallery*	10	30
W.		
At *Winchelſey*	00	45
At the *Weilings*, and from the Weſt-end of the *Wight*	01	30
Before the *Weilings*	02	15
At *Whitby*	03	00
In the Sea of *Wales* and *Severn*	04	30
In *Wales*	05	15
At *Wells*, at *Weymouth*, & at *Waterford*	06	00
At *Weymouth Key*	06	45
At the *Neſs*, by *Wieringhen*, at *Winterton*	07	30
Thwart of the *Iſle of Wight* in the Channel, all within the *Wight*, between the *Wight* and *Beachy* by the Shore	08	15
At the E. end of the *Wight*, and on *Wieringhen-Flats*	09	00
Y.		
Before *Yarmouth*	01	30
At *Youghall*	04	30
At *Yarmouth*	08	15
In *Yarmouth* Roads, and *Yarmouth* Haven	10	30
Z.		
On the Coaſt of *Zealand*	01	30
In the *Zerick-Sea*	03	00

The Uſe of the TIDE-TABLE, *in finding the Time of* High-Water.

IN this Table the Names of the Places being ſet in Alphabetical Order, they will always be found under the Letter they begin with, as for Example, *London*, will be found under the Letter L, *Torbay* under T. *Scilly* under S, *&c.* and the Figures right againſt any Place ſhews the Time of High-Water at that Place, on the Full and Change of the Moon.

Then if it be required to find the Time of High-Water at any Place upon any given Day, Firſt (by the Tables of Numbers and Times anſwering) find the Number and Time anſwering for that Day, (as before Taught) and to that Time, add the Hours and Minutes that ſtand in the Tide-Table againſt the Place you would know the Time of High-Water at, the Sum, if it does not exceed 12 Hours, will be the Time of High-water required; but if it ſhould be more than 12 Hours, then ſubtract 12 from it, and the Remainder will be the Time of High-Water.

Example.

Suppoſe it were required to find the Time of High-Water at London, *on the 11th if* January, 1764.

By the Table of Numbers, I find the Number for the 25th of *January*, to be 17, with which Number entering the Table of Times, I find the Time anſwering to be 5 H. 36 M. then looking for *London*, in the Tide-Table, I find againſt it 3 Hours, which added to the Time before found, gives 8 H. 36 M. for the Time of High-Water at *London*, on the 11th of *January*, 1764.

Example II.

Suppoſe it were required to find the Time of High-Water at St. Hellens, *on the 29th of* Auguſt, 1765.

Having found the Number (as before) to be 22, and the Time anſwering to be 9 H. 36 M. I look in the Tide-Table under the Letter H. for St. *Hellens*, againſt which I find 10 H. 30 M. which added to the Time (as before) 9.36 gives 20.06, from which ſubtract 12.00. and the Remainder 8 H. 06 M. is the Time of High-Water required.

A TABLE of the Sun's Declination for the Years 1765. 1769. 1773, and 1777.

M. Day	Jan.		Feb.		March		April		May		June		July		August		Sept.		Octob.		Nov.		Dec.	
	South		South		South		North		North		North		North		North		North		South		South		South	
1	22	59	16	57	07	24	04	44	15	14	22	08	23	08	17	58	08	09	03	22	14	37	21	55
2	22	54	16	40	07	01	05	07	15	32	22	16	23	03	17	42	07	47	03	45	14	56	22	05
3	22	48	16	22	06	38	05	31	15	50	22	24	22	59	17	27	07	25	04	08	15	15	22	13
4	22	42	16	04	06	14	05	54	16	07	22	31	22	54	17	11	07	03	04	31	15	34	22	21
5	22	35	15	46	05	51	06	17	16	24	22	38	22	48	16	55	06	41	04	54	15	52	22	29
6	22	28	15	27	05	28	06	39	16	41	22	44	22	42	16	38	06	19	05	18	16	10	22	36
7	22	20	15	08	05	05	07	02	16	58	22	50	22	35	16	21	05	56	05	41	16	28	22	43
8	22	11	14	49	04	41	07	24	17	14	22	55	22	28	16	04	05	33	06	04	16	45	22	49
9	22	03	14	30	04	18	07	46	17	30	23	00	22	21	15	47	05	10	06	27	17	02	22	55
10	21	54	14	11	03	54	08	08	17	45	23	05	22	14	15	29	04	47	06	49	17	19	23	00
11	21	45	13	51	03	30	08	30	18	01	23	09	22	06	15	11	04	24	07	12	17	36	23	05
12	21	35	13	31	03	06	08	52	18	16	23	13	21	58	14	53	04	01	07	35	17	52	23	10
13	21	25	13	11	02	42	09	14	18	31	23	17	21	49	14	35	03	38	07	58	18	08	23	14
14	21	14	12	50	02	19	09	35	18	45	23	20	21	40	14	17	03	15	08	20	18	24	23	17
15	21	03	12	29	01	55	09	57	19	00	23	22	21	31	13	58	02	52	08	42	18	39	23	20
16	20	51	12	08	01	32	10	18	19	14	23	24	21	21	13	39	02	29	09	04	18	54	23	23
17	20	39	11	48	01	08	10	39	19	27	23	26	21	11	13	20	02	06	09	26	19	09	23	25
18	20	27	11	27	00	44	11	00	19	40	23	27	21	00	13	00	01	43	09	48	19	24	23	27
19	20	14	11	05	00	21	11	21	19	53	23	28	20	49	12	41	01	20	10	10	19	38	23	28
20	20	01	10	43	No	02	11	41	20	06	23	29	20	38	12	21	00	56	10	32	19	51	23	29
21	19	48	10	22	00	26	12	02	20	18	23	29	20	27	12	01	00	33	10	54	20	04	23	29
22	19	34	10	00	00	50	12	22	20	30	23	29	20	15	11	41	00	09	11	15	20	17	23	29
23	19	20	09	38	01	14	12	42	20	41	23	28	20	03	11	21	Sou	14	11	36	20	30	23	28
24	19	05	09	16	01	37	13	02	20	52	23	27	19	50	11	00	00	38	11	57	20	42	23	27
25	18	50	08	54	02	01	13	21	21	03	23	25	19	37	10	39	01	01	12	18	20	54	23	25
26	18	35	08	31	02	24	13	40	21	14	23	23	19	24	10	18	01	25	12	38	21	05	23	23
27	18	20	08	09	02	48	14	09	21	24	23	21	19	10	09	57	01	48	12	59	21	16	23	20
28	18	04	07	46	03	11	14	19	21	34	23	18	18	56	09	36	02	12	13	19	21	26	23	17
29	17	48			03	35	14	38	21	43	23	15	18	42	09	15	02	35	13	39	21	36	23	13
30	17	31			03	58	14	56	21	52	23	11	18	27	08	53	02	58	13	58	21	46	23	09
31	17	14			04	21			22	01			18	12	08	31			14	17			23	05

A TABLE of the Sun's Declination for the Years 1762. 1766. 1770, and 1774.

A. Day	January		February		March		April		May		June		July		August		Septem.		October		Novem.		Decem.	
	South		South		South		North		North		North		North		North		North		South		South		South	
1	23	01	17	01	07	28	04	39	15	09	22	06	23	09	18	01	08	14	03	16	14	32	21	53
2	22	56	16	44	07	05	05	02	15	27	22	14	23	04	17	46	07	52	03	39	14	51	22	02
3	22	50	16	26	06	42	05	25	15	45	22	22	22	59	17	30	07	30	04	03	15	10	22	11
4	22	43	16	08	06	19	05	48	16	03	22	29	22	54	17	14	07	08	04	26	15	29	22	19
5	22	36	15	50	05	56	06	11	16	20	22	36	22	49	16	58	06	46	04	49	15	47	22	27
6	22	29	15	32	05	33	06	33	16	37	22	42	22	43	16	42	06	24	05	12	16	05	22	34
7	22	21	15	13	05	10	06	56	16	53	22	48	22	37	16	25	06	01	05	35	16	23	22	41
8	22	13	14	54	04	46	07	18	17	09	22	54	22	30	16	08	05	38	05	58	16	41	22	47
9	22	05	14	35	04	23	07	41	17	25	22	59	22	23	15	51	05	16	06	21	16	58	22	53
10	21	56	14	15	03	59	08	03	17	41	23	04	22	16	15	33	04	53	06	44	17	15	22	59
11	21	47	13	56	03	36	08	25	17	57	23	08	22	08	15	16	04	30	07	07	17	32	23	04
12	21	37	13	36	03	12	08	47	18	12	23	12	22	00	14	58	04	07	07	30	17	48	23	09
13	21	27	13	16	02	49	09	09	18	27	23	15	21	51	14	40	03	44	07	53	18	04	23	13
14	21	16	12	55	02	25	09	30	18	42	23	18	21	42	14	21	03	21	08	15	18	20	23	16
15	21	05	12	34	02	01	09	52	18	56	23	21	21	33	14	02	02	58	08	37	18	35	23	19
16	20	54	12	13	01	37	10	13	19	10	23	23	21	23	13	43	02	35	08	59	18	50	23	22
17	20	42	11	52	01	14	10	34	19	24	23	25	21	13	13	24	02	11	09	21	19	05	23	24
18	20	30	11	31	00	50	10	55	19	37	23	27	21	03	13	05	01	47	09	43	19	20	23	26
19	20	18	11	10	00	26	11	16	19	50	23	28	20	52	12	45	01	24	10	05	19	34	23	27
20	20	05	10	49	00	02	11	36	20	03	23	29	20	41	12	25	01	01	10	27	19	48	23	28
21	19	51	10	27	No	21	11	57	20	15	23	29	20	29	12	05	00	38	10	48	20	01	23	29
22	19	37	10	05	00	44	12	18	20	27	23	29	20	17	11	45	00	14	11	09	20	14	23	29
23	19	23	09	43	01	08	12	37	20	38	23	28	20	05	11	25	Sou	9	11	30	20	27	23	28
24	19	09	09	21	01	32	12	57	20	49	23	27	19	53	11	05	00	32	11	51	20	39	23	27
25	18	55	08	59	01	56	13	17	21	00	23	26	19	40	10	44	00	56	12	12	20	51	23	25
26	18	40	08	37	02	19	13	36	21	11	23	24	19	27	10	23	01	19	12	33	21	02	23	23
27	18	24	08	14	02	43	13	55	21	21	23	22	19	14	10	02	01	43	12	53	21	13	23	21
28	18	08	07	51	03	06	14	14	21	31	23	19	19	00	09	41	02	06	13	13	21	24	23	18
29	17	52			03	30	14	33	21	40	23	16	18	46	09	20	02	29	13	33	21	34	23	14
30	17	36			03	53	14	51	21	49	23	13	18	31	08	58	02	52	13	53	21	44	23	10
31	17	19			04	16			21	58			18	16	08	36			14	13			23	06

A TABLE of the Sun's Declination for the Years 1763. 1767. 1771, and 1775.

M. Day	Jan.		Feb.		March		April		May		June		July		August		Sept.		Octob.		Nov.		Dec.	
	South		South		South		North		North		North		North		North		North		South		South		South	
1	23	02	17	05	07	34	04	33	15	05	22	04	23	09	18	05	08	20	03	10	14	27	21	51
2	22	57	16	48	07	11	04	56	15	23	22	12	23	05	17	50	07	58	03	34	14	47	22	00
3	22	51	16	31	06	48	05	19	15	41	22	20	23	01	17	34	07	36	03	57	15	06	22	09
4	22	45	16	13	06	25	05	42	15	58	22	28	22	56	17	18	07	13	04	20	15	25	22	17
5	22	38	15	55	06	02	06	05	16	16	22	35	22	51	17	02	06	51	04	44	15	43	22	25
6	22	31	15	36	05	39	06	28	16	33	22	41	22	45	16	46	06	29	05	07	16	01	22	32
7	22	23	15	18	05	16	06	51	16	50	22	47	22	39	16	29	06	07	05	30	16	19	22	39
8	22	15	14	59	04	52	07	13	17	06	22	53	22	32	16	12	05	44	05	53	16	37	22	46
9	22	07	14	40	04	29	07	35	17	22	22	58	22	25	15	55	05	22	06	16	16	54	22	52
10	21	59	14	20	04	05	07	57	17	38	23	03	22	18	15	38	04	59	06	39	17	11	22	58
11	21	50	14	00	03	42	08	20	17	54	23	07	22	10	15	20	04	36	07	02	17	28	23	03
12	21	40	13	40	03	18	08	42	18	09	23	11	22	02	15	02	04	13	07	25	17	44	23	08
13	21	30	13	20	02	55	09	04	18	24	23	14	21	53	14	44	03	50	07	47	18	00	23	12
14	21	19	13	00	02	31	09	25	18	38	23	17	21	44	14	26	03	27	08	09	18	16	23	16
15	21	08	12	40	02	07	09	47	18	53	23	20	21	35	14	07	03	04	08	31	18	32	23	19
16	20	57	12	19	01	43	10	08	19	07	23	23	21	26	13	48	02	40	08	53	18	47	23	22
17	20	45	11	59	01	20	10	29	19	20	23	25	21	16	13	29	02	17	09	16	19	02	23	24
18	20	33	11	37	00	56	10	50	19	33	23	27	21	05	13	10	01	53	09	38	19	16	23	26
19	20	20	11	16	00	33	11	11	19	46	23	28	20	54	12	50	01	30	10	00	19	30	23	28
20	20	07	10	54	00	09	11	31	19	59	23	29	20	43	12	30	01	07	10	21	19	44	23	29
21	19	54	10	32	No	14	11	52	20	12	23	29	20	32	12	10	00	44	10	43	19	58	23	29
22	19	40	10	10	00	38	12	12	20	24	23	29	20	20	11	51	00	20	11	04	20	11	23	29
23	19	26	09	48	01	02	12	32	20	36	23	28	20	08	11	30	Sou	3	11	25	20	24	23	28
24	19	12	09	26	01	26	12	52	20	47	23	27	19	56	11	09	00	26	11	46	20	36	23	27
25	18	58	09	04	01	50	13	12	20	58	23	26	19	43	10	49	00	50	12	07	20	48	23	26
26	18	43	08	42	02	13	13	31	21	09	23	24	19	30	10	28	01	13	12	28	20	59	23	24
27	18	27	08	20	02	37	13	50	21	19	23	22	19	17	10	07	01	37	12	49	21	10	23	22
28	18	11	07	57	03	00	14	09	21	29	23	20	19	03	09	46	02	00	13	09	21	21	23	19
29	17	55			03	24	14	28	21	39	23	17	18	49	09	25	02	23	13	29	21	31	23	15
30	17	39			03	47	14	47	21	48	23	13	18	35	09	04	02	46	13	49	21	41	23	11
31	17	22			04	10			21	56			18	20	08	42			14	08			23	06

A TABLE of the Sun's Declination for the Years 1764. 1768. 1772, and 1776.

M. Day	January		February		March		April		May		June		July		August		Septem.		October		Novem.		Decem.	
	South		South		South		North		North		North		North		North		North		South		South		South	
1	23	03	17	09	07	16	04	50	15	19	22	10	23	07	17	53	08	03	03	28	14	42	21	58
2	22	58	16	52	06	53	05	13	15	37	22	18	23	02	17	38	07	41	03	52	15	01	22	07
3	22	52	16	35	06	30	05	36	15	54	22	25	22	57	17	22	07	19	04	15	15	20	22	15
4	22	45	16	17	06	07	05	59	16	11	22	32	22	52	17	06	06	57	04	38	15	39	22	23
5	22	39	15	59	05	44	06	22	16	28	22	39	22	46	16	50	06	35	05	01	15	57	22	31
6	22	33	15	41	05	21	06	45	16	45	22	45	22	40	16	33	06	12	05	24	16	15	22	38
7	22	26	15	23	04	58	07	08	17	02	22	51	22	34	16	16	05	50	05	47	16	33	22	45
8	22	18	15	04	04	34	07	30	17	18	22	56	22	27	15	59	05	27	06	10	16	50	22	51
9	22	10	14	45	04	11	07	52	17	34	23	01	22	20	15	42	05	04	06	33	17	07	22	56
10	22	01	14	25	03	47	08	14	17	50	23	06	22	12	15	24	04	41	06	56	17	24	23	01
11	21	52	14	05	03	24	08	36	18	05	23	10	22	04	15	06	04	18	07	19	17	40	23	06
12	21	42	13	45	03	00	08	58	18	20	23	13	21	55	14	48	03	55	07	41	17	56	23	10
13	21	32	13	25	02	37	09	20	18	35	23	17	21	46	14	30	03	32	08	03	18	12	23	14
14	21	22	13	05	02	13	09	42	18	49	23	20	21	37	14	11	03	09	08	25	18	28	23	18
15	21	11	12	45	01	49	10	03	19	03	23	23	21	28	13	53	02	46	08	48	18	43	23	21
16	20	59	12	24	01	25	10	24	19	17	23	25	21	18	13	34	02	23	09	10	18	58	23	23
17	20	48	12	03	01	01	10	45	19	31	23	27	21	08	13	15	02	00	09	33	19	13	23	24
18	20	36	11	42	00	38	11	06	19	44	23	28	20	57	12	55	01	36	09	55	19	27	23	25
19	20	23	11	21	00	14	11	27	19	57	23	29	20	46	12	36	01	13	10	17	19	41	23	27
20	20	10	10	59	No	09	11	47	20	09	23	29	20	35	12	16	00	49	10	38	19	54	23	29
21	19	57	10	38	00	33	12	07	20	21	23	29	20	24	11	56	00	26	10	59	20	07	23	29
22	19	44	10	16	00	56	12	27	20	33	23	29	20	12	11	35	00	02	11	20	20	23	23	29
23	19	30	09	54	01	20	12	47	20	44	23	28	19	59	11	15	Sou	21	11	41	20	32	23	28
24	19	16	09	31	01	44	13	07	20	55	23	27	19	46	10	54	00	44	12	02	20	44	23	26
25	19	01	09	09	02	08	13	27	21	06	23	25	19	33	10	33	01	08	12	23	20	56	23	24
26	18	46	08	47	02	31	13	46	21	16	23	23	19	20	10	12	01	31	12	43	21	08	23	22
27	18	31	08	25	02	54	14	05	21	26	23	20	19	06	09	51	01	55	13	04	21	19	23	20
28	18	15	08	02	03	17	14	24	21	36	23	17	18	52	09	30	02	18	13	24	21	30	23	17
29	17	59	07	39	03	41	14	43	21	45	23	14	18	38	09	09	02	41	13	44	21	40	23	13
30	17	43			04	04	15	01	21	54	23	11	18	23	08	47	03	05	14	04	21	49	23	09
31	17	26			04	27			22	02			18	08	08	25			14	23			23	04

A TABLE of the Variation of the Sun's Declination, to every 10 Degrees of Longitude.

Degrees of Longitude from the Meridian of *London*.

Daily Varia.	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
Min.	min.	min.	min.	min.	min.	min.	min.	min.	min.	min.	min.	min.	min.	min.	min.	min.	min.	min.
2	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
3	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
4	0	0	0	0	1	1	1	1	1	1	1	1	1	2	2	2	2	2
5	0	0	0	0	1	1	1	1	1	1	1	2	2	2	2	2	2	2
6	0	0	0	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3
7	0	0	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	3
8	0	0	1	1	1	1	1	2	2	2	2	3	3	3	3	3	4	4
9	0	0	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4
10	0	1	1	1	1	2	2	2	3	3	3	3	4	4	4	5	5	5
11	0	1	1	1	2	2	2	3	3	3	3	4	4	4	5	5	5	5
12	0	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6
13	0	1	1	1	2	2	2	3	3	4	4	4	5	5	5	6	6	6
14	0	1	1	2	2	2	3	3	3	4	4	5	5	5	6	6	7	7
15	0	1	1	2	2	3	3	3	4	4	5	5	5	6	6	7	7	7
16	0	1	1	2	2	3	3	4	4	5	5	5	6	6	7	7	8	8
17	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	7	8	8
18	1	1	2	2	3	3	4	4	5	5	6	6	7	7	7	8	9	9
19	1	1	2	2	3	3	4	4	5	5	6	6	7	7	7	8	9	9
20	1	1	2	2	3	3	4	4	5	6	6	7	7	8	8	9	9	10
21	1	1	2	2	3	4	4	5	5	6	6	7	8	8	9	9	10	10
22	1	1	2	2	3	4	4	5	6	6	7	7	8	9	9	10	10	11
23	1	1	2	3	3	4	4	5	6	6	7	8	8	9	10	10	11	11
24	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10	11	11	12

To find the Sun's Declination, by the foregoing TABLES.

EACH Page of the foregoing Tables contains the Sun's Declination for the four Years that it is mark'd with at the Top, and is divided into thirteen Columns; the firſt of which to the Left-Hand, ſhews the Day of the Month, and the other Twelve the Months of the Year, ſo that if it be required to find the Sun's Declination for any Day, as ſuppoſe for Example, on the 21ſt of *Auguſt*, 1763: Firſt I look for that Table that has 1763 at the Top of it, and then right againſt the 21ſt Day of the Month, and under *Auguſt*, I find 12, 10, which ſhews the Sun's Declination to be 12 Degrees 10 Minutes North; according to the Title at the Top of the Column.

The Sun's Declination in theſe Tables being calculated for the Meridian of *London*, if you ſhould be conſiderably to the Eaſtward or to the Weſtward of *London*, it will cauſe ſome Alteration in it; to correct which, the

Table of Variation of the Sun's Declination is to be uſed as follows.

Firſt, Look out the Declination for the given Day of the Month, and for the Day following it, and ſubtract the leſſer from the greater, the Remainder is the Daily Variation.

Second, Obſerve whether the Declination be increaſing or decreaſing, which you may know thus; if the Declination for the Day following the given Day be biggeſt, then it is increaſing; but if it be leaſt, it is decreaſing.

Third, Look for the Daily Variation in the firſt Column of the Table, and ſee what Number ſtands right againſt it, and under the given Degrees of Longitude; which Number is to be uſed as follows.

If the Difference of Longitude be Eaſterly, and the Declination increaſing, it muſt be ſubtracted from the Declination found in the Tables for the given Day; but if the Declination be decreaſing, it muſt be added.

If the Difference of Longitude be Weſterly, and the Declination increaſing, it muſt be added; but if the Declination be decreaſing, it muſt be ſubtracted; the Sum in one Caſe, and the Remainder in the other will be the Sun's Declination at Noon in the Longitude required.

A TABLE of the Sun's Right Aſcenſion.

M. Day	January	February	March	April	May	June	July	Auguſt	Septem.	October	Novem.	Decem.
	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
1	18 50	21 02	22 51	00 44	02 35	04 38	06 42	08 47	10 43	12 31	14 28	16 32
2	18 54	21 06	22 54	00 48	02 39	04 42	06 46	08 51	10 47	12 35	14 31	16 36
3	18 58	21 10	22 58	00 51	02 43	04 46	06 50	08 55	10 50	12 38	14 35	16 40
4	19 03	21 14	23 02	00 55	02 47	04 50	06 55	08 59	10 54	12 42	14 39	16 45
5	19 07	21 18	23 05	00 59	02 51	04 54	06 59	09 02	10 57	12 46	14 43	16 49
6	19 12	21 22	23 09	01 02	02 54	04 59	07 03	09 06	11 01	12 49	14 47	16 53
7	19 16	21 26	23 13	01 06	02 58	05 03	07 07	09 10	11 05	12 53	14 51	16 58
8	19 20	21 30	23 17	01 10	03 02	05 07	07 11	09 14	11 08	12 57	14 55	17 02
9	19 25	21 34	23 20	01 13	03 06	05 11	07 15	09 18	11 12	13 00	14 59	17 07
10	19 29	21 38	23 24	01 17	03 10	05 15	07 19	09 21	11 16	13 04	15 03	17 11
11	19 33	21 42	23 28	01 21	03 14	05 19	07 23	09 25	11 19	13 08	15 07	17 15
12	19 38	21 46	23 31	01 24	03 18	05 23	07 27	09 29	11 23	13 11	15 12	17 20
13	19 42	21 50	23 35	01 28	03 22	05 27	07 31	09 33	11 26	13 15	15 16	17 24
14	19 46	21 53	23 39	01 32	03 26	05 32	07 36	09 37	11 30	13 19	15 20	17 29
15	19 51	21 57	23 42	01 35	03 30	05 36	07 40	09 40	11 33	13 23	15 24	17 33
16	19 55	22 01	23 46	01 39	03 34	05 40	07 44	09 44	11 37	13 26	15 28	17 38
17	19 59	22 05	23 50	01 43	03 38	05 44	07 48	09 48	11 41	13 30	15 32	17 42
18	20 04	22 09	23 53	01 46	03 41	05 48	07 52	09 52	11 44	13 34	15 36	17 46
19	20 08	22 13	23 57	01 50	03 45	05 52	07 56	09 55	11 48	13 38	15 40	17 51
20	20 12	22 17	00 00	01 54	03 49	05 57	08 00	09 59	11 51	13 41	15 45	17 55
21	20 16	22 20	00 04	01 58	03 53	06 01	08 04	10 03	11 55	13 45	15 49	18 00
22	20 20	22 24	00 07	02 01	03 57	06 05	08 08	10 06	11 59	13 49	15 53	18 04
23	20 25	22 28	00 11	02 05	04 01	06 09	08 12	10 10	12 02	13 53	15 57	18 09
24	20 29	22 32	00 15	02 09	04 06	06 13	08 16	10 14	12 06	13 57	16 02	18 13
25	20 33	22 36	00 19	02 13	04 10	06 17	08 20	10 17	12 09	14 00	16 06	18 18
26	20 37	22 39	00 22	02 16	04 14	06 22	08 23	10 21	12 13	14 04	16 10	18 22
27	20 41	22 43	00 26	02 20	04 18	06 26	08 27	10 25	12 17	14 08	16 14	18 26
28	20 45	22 47	00 30	02 24	04 22	06 30	08 31	10 28	12 20	14 12	16 19	18 31
29	20 49		00 33	02 28	04 26	06 34	08 35	10 32	12 24	14 16	16 23	18 35
30	20 54		00 37	02 31	04 30	06 38	08 39	10 36	12 27	14 20	16 27	18 40
31	20 58		00 40		04 34		08 43	10 39		14 24		18 44

A TABLE of the Right Aſcenſion and Declination of ſome of the moſt noted Fixed Stars.

The Names of the Stars.	Right Aſcen. H.	M.	Declination. D.	M.
The Bright Star of Aries	01	53	22	17 N
Meduſa's Head, Algol	02	52	39	59 N
The Bright-ſide of Perſeus	03	07	48	58 N
The Bull's Eye, Aldebaran	04	22	15	59 N
The Goat Star, Capella	04	59	45	43 N
The Bright-foot of Orion, Regel	05	01	08	28 S
The Northern Horn of the Bull	05	09	28	21 N
Orion's Left Shoulder	05	10	06	04 N
The Southern Horn of the Bull	05	21	20	56 N
Middle Star in Orion's Belt	05	22	01	25 S
Orion's Right Shoulder	05	52	07	20 N
Aurigas's Right Shoulder	05	44	44	54 N
Bright Foot of Gemini	06	20	16	38 N
The Dog Star, Syrius	06	34	16	23 S
Caſtor, or the Head of the Northermoſt Twin	07	17	32	24 N
The little Dog Star, Procyon	07	24	05	49 N
Pollux, or the Head of the Southermoſt Twin	07	28	28	36 N
Hydra's Heart	09	16	07	37 S
The Lyon's Heart, Regulus	09	53	13	09 N
The Lower of the Pointers	10	45	57	41 N
The Upper of the Pointers	10	46	63	03 N
The Lyon's Tail, Deneb	11	35	15	55 N
Upper of the two laſt in the ſquare of Great Bear	12	02	58	35 N
The Firſt in the Great Bear's Tail	12	41	57	18 N
The Virgin's Spike	13	12	09	52 S
The middle of the Three in the Great Bear's Tail	13	11	56	22 N
Laſt but one in the Tail of Hydra	13	04	21	43 S
Laſt in the Great Bear's Tail	13	36	50	31 N
Arcturus	14	03	20	30 N
Bright Star in the Southern Ballance	14	35	14	53 S
Foremoſt Guard	14	51	75	15 N

Bright

A TABLE of the Fixed Stars.

The Names of the Stars.	Right Aſcen. H.	M.	Declination, D.	M.	
Bright Star of the Crown	15	22	27	33	N
Bright Star in the Serpent's Neck	15	31	07	18	N
The Scorpion's Heart, Antares	16	14	25	51	S
The Head of Hercules	17	03	14	40	N
In the Head of Serpentarius	17	22	12	47	N
Bright Star in the Dragon's-Head	17	50	51	32	N
Lyræ, or the Harp	18	27	38	33	N
Swan's Beak	19	17	27	29	N
Bright Star in the Eagle	19	39	08	14	N
The Swan's Tail	20	33	44	19	N
Pegaſus's Mouth	21	27	08	39	N
Fomelhaut	22	42	30	55	S
Pegaſus's Wing, Marchab	22	53	13	53	N
Pegaſus's Leg, Scheat	22	52	26	43	N
Cepheus's Knee	23	20	76	07	N
The Head of Andromeda	23	54	27	34	N
End of Pegaſus's Wing, Algenib	23	58	13	39	N
Pole Star	00	42	88	00	N
Girdle of Andromeda	00	53	34	05	N

A TABLE of the Right Aſcenſion and Declination of the *Croſiers.*

	Right Aſcen. H.	M.	Declination. D.	M.	
The Weſtermoſt of the two middle Stars	12	01	57	11	S
The Eaſtermoſt	12	33	58	06	S
The Northermoſt or higheſt Star	12	16	55	30	S
The Southermoſt or Loweſt	12	12	61	31	S

To

To work an Obſervation, Or, to find the Latitude of the Place by the Tables of the Sun or Stars Declination, and their Zenith Diſtance, &c.

Note, WHEN you take an Obſervation of the Sun, by the common Sea Quadrant, the Degrees and Minutes that your ſight Vane ſtands at, being added to the Degrees that your Shade or Glaſs Vane ſtands at, will give the Zenith Diſtance (or Complement of the Meridian Altitude) with which and the Declination found in the Tables, you may find the Latitude as follows.

Firſt, Take Notice whether the Sun or Star be to the Northward or to the Southward of you at the Time of Obſervation; if they are to the Northward, call your Zenith Diſtance North; or if they are to the Southward, call it South. Then,

Second, If the Zenith Diſtance and Declination are both North, or both South, ſubtract the leſſer from the greater, the Remainder will be the Latitude you are in, of the ſame Name with the Declination, if that be greater than the Zenith Diſtance, otherwiſe of a contrary Name.

Example 1ſt, Being at Sea on the 23*d* of *Auguſt*, 1763, I obſerved at Noon, and had on my Quadrant 8.34, (and the Sun to the Northward of me) what Latitude am I in?

Zenith Diſtance	8.34 North
Declination	11.30 North
Latitude by Obſervation	2.56 North

Example 2d, Being at Sea on the 23*d* of *December*, I took the Altitude of the Dog Star *Syrius*, (on the Meridian to the Southward of me) 60.00. I would know the Latitude?

Note, In all Caſes (except where the Object is obſerved on the Meridian below the Pole) if the Meridian Altitude be given inſtead of the Zenith Diſtance, (as it is in this Example) then ſubtract it from 90.00, and the Remainder will be the Zenith Diſtance.

Meridian Altitude from 90.00, leaves the Zen. Diſt.	30.00 South
Star's Declination, (by the Table)	16.23 South
Latitude by Obſervation	13.37 North

To

To work an Obſervation.

Caſe the 2d, If the Zenith Diſtance and Declination be one North, and the other South, add them together, and their Sum will be the Latitude in, of the ſame Name with the Declination.

Example 1ſt, Being at Sea, on the *3d* of *November*, 1763, I obſerved at Noon, and had on my Quadrant 8.17, (and the Sun to the Northward of me) I demand the Latitude?

Zenith Diſtance	08.17	North
Declination	15.06	South
Latitude by Obſervation	23.23	South

Example 2d, Being at Sea on the *21ſt* of *June*, 1765, I took the Altitude of the Bright Star in the *Harp*, *Lyræ*, (on the Meridian to the Southward of me) 51.00. I demand the Latitude?

Complement Altitude, or Zenith Diſtance	39.00	South
Star's Declination	38.33	North
Latitude by Obſervation	77.33	North

The foregoing Rules are for obſerving by the Sun or Stars, when they are at their greateſt Altitude, or upon the Meridian above the Pole; but as in ſome Parts of the Earth the Sun does not ſet for ſeveral Days, and ſome Stars never ſet; in that Caſe they may be obſerved upon the Meridian, twice in the 24 Hours, that is, once at their greateſt Height (as before) and again, when they are at the loweſt, or upon the Meridian below the Pole; to work which Obſervation take the following Rule.

Add the Complement of the Declination to the Meridian Altitude, the Sum is the Latitude of the ſame Name with the Declination.

Example, Being at Sea I took the Altitude of the Pole Star on the Meridian below the Pole, 46.21, I demand the Latitude?

Meridian Altitude	46.21	
Complement Declination	02.00	North
Latitude by Obſervation	48.21	North

The

The Uſe of the TABLES of the Sun's and Stars Right Aſcenſion, in finding what Time any known Star will be upon the Meridian, on any given Day.

Rule, Look for the Right Aſcenſion of the Sun and Star in the foregoing Tables, and ſubtract the Sun's Right Aſcenſion from the Star's; but if the Sun's Right Aſcenſion be biggeſt, add 24 Hours to the Star's Right Aſcenſion, and then ſubtract the Sun's from it, the Remainder will be the Time of the Star's coming to the Meridian, after Noon.

Example 1ſt, What Time will the *Lion's Tail* be upon the Meridian, on the 14*th* of *April?*

	h. m.
Star's Right Aſcenſion	11.35
Sun's Right Aſcenſion	01.32
Time the Star will be on the Meridian	10.03 at Night

Example 2d, What Time will the *Bull's Eye* be on the Meridian, on the 26th of *October?*

Star's Right Aſcenſion 4h. 22m. add 24h. makes	28.22
Sun's Right Aſcenſion	14.04
Time the Star will be on the Meridian	14.18 Afternoon,

that is, at 18m. paſt 2 in the Morning.

To find what Star will come upon the Meridian, at any given Time.

Rule, Add the Time from Noon, to the Right Aſcenſion of the Sun, the Sum will be Right Aſcenſion of the Star required to be known, with which enter the Table of the Star's Right Aſcenſion, and find what Star's Right Aſcenſion agrees with, or comes the neareſt to it, and that is the Star required.

Example 1ſt, I would know what Star would be on the Meridian, about Eight at Night, on the 7*th* of *April*.

	h. m.
Sun's Right Aſcenſion	01.06
Time from Noon	08.00

Right Aſc. of the req. Star, the neareſt to which 09.06 is *Hydra's Heart.*

Example 2d, I would know what Star will be on the Meridian, at ¼ paſt 2 in the Morning, on the 26*th* of *June*.

	h. m.
Sun's Right Aſcenſion	06.22
Time from Noon	14.15

Rt. Aſc. of req. Star, neareſt to which in the Tables 20.37 is *Swan's Tail.*

A TABLE of the Latitudes and Longitudes of Places, accounting the Longitudes from the Meridian of *LONDON*.

Places Names.	Latitude		Longitude		
The Coaſt of *England.*	D.	M.	D.	M.	
BErwick	55	48	01	45	W
Newcaſtle	55	12	01	30	W
Stockton	54	33	01	25	W
Spurn	53	45	00	13	E
Yarmouth	52	40	01	40	E
London	51	32	00	00	
North Foreland	51	25	01	24	E
Beachy Head	50	46	00	25	E
Dunnoſe	50	38	01	23	
Portland	50	30	02	44	
Start	50	07	03	47	
Lizard	49	57	05	14	
Land's End	50	06	06	00	
St. Mary Scilly	49	57	06	10	
Hartland Point	51	06	04	35	
Lundy Iſle	51	20	04	40	
Briſtol	51	33	04	35	
St. David's Head	51	00	05	22	
Barſey Iſle	52	44	05	00	
Holy-head	53	23	04	50	
Leverpool	53	20	03	00	
Whitehaven	54	25	03	30	
Carliſle	54	47	03	05	

North Latitude. Weſt Longitude

The Coaſt of *Scotland.*					
Glaſcow	55	52	04	05	
N. Part of Sky Iſle	57	45	05	45	
N. Part of Lewis Iſle	58	20	07	20	
St. Kilday	57	52	09	45	
Farra Head	58	34	05	10	
Iſles of Orkney	59	10	03	22	
Shetland S. Point	60	04	02	00	
Buchaneſs	57	45	01	18	

North Latitude. Weſt Longitude

Places Names.	Latitude		Longitude		
	D.	M.	D.	M.	
Aberdeen	57	24 N	01	40	W
Dundee	56	28 N	02	40	W
Edenburgh	55	58 N	02	59	W

The Coaſt of *Ireland.*					
Dublin	53	12	06	56	
Wexford	52	13	07	27	
Waterford	52	09	08	40	
Cork	51	49	09	30	
Cape Clear	51	17	11	10	
Limeric	52	23	09	35	
Galway	53	07	09	40	
Sline Head	53	20	11	15	
Londonderry	55	00	07	50	
Bellfaſt	54	39	06	05	

North Latitude. Weſt Longitude

The Coaſt of *Holland* and *Flanders.*					
Scaw	57	30	10	20	
Helighland	54	24	08	35	
Hambrough	53	41	10	35	
Embden	53	05	07	35	
The Fly	53	15	05	30	
The Texel	53	15	05	10	
Amſterdam	52	23	05	04	
Rotterdam	51	55	04	30	
The Brill	52	00	04	00	
Sluice	51	14	03	43	
Calais	50	58	01	54	

North Latitude. Eaſt Longitude.

The Coaſt of *France* and *Portugal.*					
Diep	49	56 N	01	09	E
Cape de Hague	49	47 N	02	00	W
Gaſkets	49	50 N	02	20	W
Guernſey	49	33 N	02	20	W

A TABLE of Latitudes and Longitudes.

Places Names.	Latitude		Longitude	
The Coaſt of *France* and *Portugal.*	D.	M.	D.	M.
Morlaix	48	33	03	49
Uſhant	48	30	05	02
Breſt	48	23	04	25
Penmark	47	48	04	24
Bell Iſle	47	20	03	16
Nantz	47	14	01	39
Iſland Dieu	46	34	02	13
Iſle of Ree	46	10	01	30
Rochel	46	10	01	11
Bourdeaux	44	50	00	38
Bilboa	43	29	02	58
Cape Ortegal	44	04	07	48
Cape Finiſter	43	12	09	40
Oporto	41	10	09	25
Burlings	39	35	09	24
Rock of Liſbon	38	54	09	50
Cape St. Vincent	36	53	09	06
Cadiz	36	33	06	01
Cape Trefalgar	36	10	06	01
On the Main Continent within the *Straits.*				
Gibraltar	36	12	04	53W
Cape de Gat	36	40	01	40W
Cape Paul	38	15	00	05
Cape Martin	48	46	00	40
Barcelona	41	26	02	18
Marſeilles	43	18	05	27
Toulon	43	07	06	02
Genoa	44	25	08	43
Leghorn	43	28	10	35
Rome	41	54	12	45
Naples	40	51	14	46
Cape Sparreventuro	37	55	16	55
Cape Cellene	38	56	18	05
Gallipoli	39	56	18	43
Cape St. Mary	39	45	19	00

North Latitude. / Weſt Longitude. / North Latitude. / East Longitude.

Places Names.	Latitude		Longitude	
	D.	M.	D.	M.
Ancona	43	40	14	26
Venice	45	25	12	10
Lepanto	38	10	22	52
Cape Matapan	36	33	22	41
Cape St. Angelo	36	32	23	56
Athens	37	58	24	05
Cape Martelo S. part of Negropont	38	07	25	03
Cape Monte Sancto	40	26	25	02
Gallipoly	40	33	27	20
Conſtantinople	40	59	28	56
Smyrna	38	28	27	25
Epheſus	38	01	27	53
Antiocheta	36	30	32	46
Scandaroon	36	34	36	30
Tripoli	34	38	36	15
Alexandria	31	10	30	19
Cape Ruſato	32	48	21	25
Cape Miſerato	32	21	16	17
Tripoly	32	54	13	10
Cape Bona	37	03	11	04
Bona	37	02	08	19
Algier	37	05	03	16
Cape de Tres Forcas	35	30	02	04W
Tetuan	35	27	05	06W
Ceuta	35	54	04	45W
Tangier	35	42	05	22W
Iſlands within the *Straits.*				
Alboran	35	54	02	29W
Formentaria	38	33	01	55
Yvica	38	50	01	40
Majorca City	39	30	03	03
Port Mahon	39	42	04	12
Gallita	37	41	08	44
S. end of Sardinia	38	46	09	12
N. end of Corſica	42	56	09	50

North Latitude. / East Longitude.

A TABLE of Latitudes and Longitudes.

Places Names.	Latitude		Longitude		
Iſlands within the *Straits*.	D.	M.	D.	M.	
Gorgona	43	34	09	38	North Latitude / East Longitude
Captia	43	03	14	54	
Liſboa	42	45	11	00	
Meſſina	38	07	16	20	
Maritimo	38	12	17	09	
Cape Paſſaro	36	38	15	40	
Malta	35	53	14	32	
Corfu	39	42	20	06	
Zephalonia	38	15	21	00	
Zant	37	46	21	14	
Morea	36	52	21	32	
Lemnos	39	59	25	37	
Scio	38	22	26	12	
C. St. John Weſt end of Candia	35	15	24	00	
CapeSolomonEaſt end of Candia	35	00	27	08	
City of Rhodes	36	42	28	05	
Weſt-end of Cyprus	34	57	32	23	
Eaſt-end of Cyprus	35	31	35	00	
The Coaſt of *Barbary* and *Guiney*.					
Cape Spartel	35	50	05	49	North Latitude / Weſt Longitude
Sallee	33	51	06	25	
Cape Cantin	32	36	09	10	
Cape de Geer	30	27	10	06	
Cape Bajadore	26	04	15	35	
Cape Olerado	23	41	15	50	
Cape Blanco	20	32	17	35	
Senegal	15	28	16	25	
Cape de Verde	14	43	17	20	
River Gambia	13	08	15	31	
Sierralion	08	36	12	57	
Cape Monſerado	06	05	10	02	
Cape Palmas	04	13	06	45	
Jaque Jaque	04	16	02	47	

Places Names.	Latitude		Longitude		
	D.	M.	D.	M.	
Aſſinee	04	15	02	17 W	North Latitude / Eaſt Longitude
Cape 3 Points	04	28	01	50 W	
River Volta	05	55	03	25	
River Formoſa	07	00	07	20	
Cape Formoſa	04	15	06	40	
New Callabar	04	42	08	33	
Old Callabar	04	19	09	45	
River Camaroons	03	25	10	10	
River Angra	00	50	10	01	
Cape Lopez	00	55	09	55	South Latitude / Eaſt Longitude
River Congo	05	40	15	25	
Angola	08	57	15	56	
Cape Negro	16	08	12	31	
Cape St. Thomas	24	10	14	43	
Cape Bona Eſperance	34	07	19	35	
Weſtern Iſlands.					
Corvo	39	54	30	55	North Latitude / Weſt Longitude
Flores	39	32	30	54	
Fial	38	53	28	15	
Pico	38	40	27	20	
St. George	38	52	26	03	
Tercera	38	57	25	34	
St. Michael	38	06	23	36	
Sr. Maries	36	59	23	38	
The Canary Iſlands.					
Ferro	27	54	17	45	North Latitude / Weſt Longitude
Palma	28	40	17	36	
Gomera	28	06	17	05	
Tenariff	28	23	16	28	
Madera Weſt-end	32	44	17	26	
Porto Sancto	33	12	15	54	
Canaria	27	52	15	10	
Forteventura	28	05	13	36	
Lancerota	29	02	12	45	

A TABLE of Latitudes and Longitudes.

Places Names.	Latitude			Longitude		
Cape *de Verde* Iſlands.	D.	M.		D.	M.	
St. Vincent	17	04	North Latitude.	24	39	Weſt Longitude.
St. Lucia	17	00		24	30	
St. Nicholas	16	50		23	48	
Brava	14	28		24	02	
Fuego	14	50		23	41	
St. Jago	15	08		22	56	
Iſle of May	15	14		22	02	
Iſle Sal	16	50		22	08	
Bonaviſta	16	05		22	07	
The Southern Iſlands.						
St. Matthews	01	30	S	06	01	W
Aſcenſion	07	40	S	14	25	W
St. Hellena	16	00	S	06	14	W
Fernandepo	02	40	N	10	30	E
Princes	01	40	N	09	15	E
St. Thomas	00	00		08	20	E
Annabona	02	10	S	07	27	E
The Coaſts on the Main Continent in the *Eaſt-Indies*.						
Cape Lagulias	34	54	S	21	20	
Cape Corientes	23	40	S	36	17	
Moſambique	15	04	S	41	10	
River de Fugos	00	14	S	41	15	
Cape Baſſos	04	06		47	38	East Longitude.
Cape Guardafoy	11	44		51	20	
Cape Roſulgat	22	41		59	45	
Cape Muca	23	32	North Latitude	59	45	
Buſſera	29	45		49	20	
Surrat	21	10		72	25	
Goa	15	31		73	50	
Callicut	11	16		75	30	
Cochin	09	54		75	55	
Cape Comarine	07	50		77	25	
Fort St. George	13	11		80	32	
Dew Point	16	08		81	32	

Places Names.	Latitude			Longitude		
	D.	M.		D.	M.	
Viſegapatam	17	43	North Latitude.	83	57	East Longitude
Cape Palmiras	20	42		87	52	
Bengal	22	17		92	21	
Cape Negrais	16	23		93	00	
Malacca	02	12		102	10	
Siam Entrance	14	18		100	55	
Cambodia Entrance	10	28		105	00	
Cochin	14	05		107	56	
Canton	23	14		113	06	
Amoy or Quemoy	24	35		116	50	
Lampo	29	59		120	35	
Nanquin	32	55		120	01	
Iſlands in the *Eaſt-Indies*.						
Madagaſcar or St. Laurence — S. end	25	47	South Latitude	46	10	East Longitude
Madagaſcar or St. Laurence — N. end	12	10		51	05	
Mayetta	13	10		45	38	
Mohilla	12	05		44	23	
Comero	11	40		43	50	
St. Juan de Nova	16	30		42	40	
Mauritius	20	10		52	55	
Digo Royes	19	50		61	30	
Romiras de Caſtelamos	28	45		67	17	
Amſterdam	38	40		72	45	
St. Brandon	16	38		64	30	
Diego Gratioſa	08	40		68	25	
Quabella	03	53		52	36	
Baſſos de Chagos	06	55		68	45	
Yas de Diego Rays	00	20	N. Latitude	72	00	
Maldivia — N. end	07	14		73	04	
Maldivia — S. end	00	25		76	22	
Malique	09	00		72	58	
Sacatra	12	21		54	05	
Abdeleur	12	04		53	04	

A TABLE of Latitudes and Longitudes.

Places Names.	Latitude			Longitude		
Iſlands in the *Eaſt-Indies.*	D.	M.		D.	M.	
C. Gallo, in Zeloan	06	07	North Latitude.	81	15	East Longitude.
Yas de Amber	00	00		52	30	
Andaman	12	10		93	32	
Nicobar	07	11		93	40	
Sumatra NW.end	05	22		94	50	
Verkins Iſland	02	22		94	07	
Naſſau Iſland	02	54	South Latitude.	99	32	
Bencola	03	55		104	08	
Sumatra SE. end	05	22		105	10	
Engano	05	50		101	43	
Selam	08	20		102	13	
Princes Iſland	06	30		104	02	
Bantam in Java	06	11		105	55	
Batavia	06	16		106	46	
Java E. end	08	32		113	30	
Straits of Sundy	06	02		105	46	
Banca S. end	03	20		106	45	
Borneo S. point	03	54		113	37	
Bandy Iſles	04	55		127	17	
Celebes S. end	05	10		119	07	
Celebes N. end	01	40	North Latitude.	121	20	
Mindano W. point	06	40		119	15	
Borneo N. point	07	10		113	05	
Luconia SW.point	12	30		120	10	
Luconia NE. point	18	35		120	05	
Anian W. point	19	30		107	00	
Anian E. point	19	55		109	55	
Formoſa S. point	22	00		119	56	
Formoſa N. point	25	30		120	45	
Piſcadore Iſles	23	30		118	35	
Iſland Chuſan	30	38		120	35	
Japan SE. point	35	30		140	30	
Japan SW. point	35	00		128	30	

Places Names.	Latitude			Longitude		
The Coaſt of *America* in the *South-Sea.*	D.	M.		D.	M.	
Cape St. Sebaſtians	42	45	North Latitude.	127	55	Weſt Longitude.
Cape St. Lucia	23	20		111	46	
Cape Corientes	19	40		109	30	
Aquapulco	17	05		104	18	
Aquatulco	15	27		102	03	
Guatimala	14	25		101	00	
Panama	08	50		81	52	
Bay Bonaventura	03	24		78	06	
Iſle Gallopega	00	00		90	10	
Cape del Ajugo	06	30	South Latitude.	84	50	
Lima	12	15		77	30	
Arica	18	29		73	10	
La Serena	29	00		76	22	
I. Juan Fernando	33	15		83	18	
Baldivia	39	35		81	10	
Port Steven	46	50		82	36	
Cape Victory	52	00		83	10	
Cape Horn	57	58		79	55	

The Coaſt of *Brazil* from Cape *Horn* to Cape *Roque.*

Magellan E. ent.	52	00	South Latitude.	75	05	Weſt Longitude.
River Julian	48	40		74	34	
Cape Blanco near River Camaroons	46	50		72	07	
Buenos Ayres or River Plate	36	10		57	54	
River Grand	31	55		52	00	
St. Katherines	27	50		49	00	
Cape Frio	23	00		42	20	
Spirito Sancto	19	59		42	10	
P. Segura	16	31		40	35	
Bay Todos Sanctos	12	46		41	00	
River St. Franciſco	10	50		37	50	

A TABLE of Latitudes and Longitudes.

Places Names.	Latitude			Longitude		
The Coaſt of *Brazil*, &c.	D.	M.		D.	M.	
Cape St. Auguſtine	08	35	S	35	20	W
Cape Roque	05	00	S	35	47	W
Triſtian de Cunha	37	05	S	13	24	W
Trinidada	20	30	S	30	00	W
Main Continent in the *Weſt-Indies*.						
R. Amazons Entr.	00	00	North Latitude	49	56	Weſt Longitude
North Cape	02	05		49	56	
Surinam	06	25		56	50	
Oronoque	08	15		59	25	
Cape Conquibaca	12	40		70	42	
Carthagena	10	28		75	21	
Scots Settlement	08	30		78	45	
Nicaragua Entrance	11	25		84	15	
Cape Catoche	21	10		86	10	
Campechy	19	30		92	10	
La Vera Cruz	19	12		97	48	
Eſcondido	30	20		89	30	
Cape Florida	24	57		80	30	
The Caribbee Iſlands.						
Trinidado	10	15	North Latitude	60	17	Weſt Longitude.
Tobago W. end	11	10		59	10	
Granado	11	57		60	20	
Barbadoes	12	58		58	50	
St. Vincent	13	12		60	12	
St. Lucia	13	55		60	04	
Martinico	14	43		60	54	
Dominico	15	23		60	30	
Marigallante	15	58		60	20	
Guardalupe	16	10		61	15	
Monſerat	16	45		62	15	
Antigua	17	05		61	45	
Nevis	17	05		62	32	
St. Chriſtophers	17	17		62	40	
Barbuda	17	56		60	40	

Places Names.	Latitude			Longitude		
	D.	M.		D.	M.	
St. Bartholomew	17	52	North Latitude	62	06	Weſt Longitude
St. Martins	18	06		62	10	
Anguilla	18	17		62	13	
Virgins	18	30		63	25	
St. Cruz	17	52		63	30	
Bieque	18	00		63	15	
Porto Rico St. Johns	18	30		65	37	
St. Domingo Hiſp.	18	25		69	30	
Port Royal Jamaica	17	40		76	32	
Eaſt end of Cuba	20	15		73	55	
Havanna	22	40		82	55	
Bay of Hondy	22	45		83	40	
Cape St. Antony	21	45		85	32	
***Bahama* Iſlands.**						
Bermudas	32	25	North Latitude	63	40	Weſt Longitude
N. point of Bahama Bank	28	00		78	35	
Bahama Iſland	26	50		79	36	
Abacco S. point	26	00		73	46	
Harbour Iſland	25	37		76	47	
Andros N. point	25	10		78	50	
Providence	25	00		77	20	
Illathera S. point	24	40		75	56	
Cat Iſland	24	25		75	09	
Watling Iſland	24	03		74	35	
Rum Key	23	45		74	50	
Exuma	23	22		75	55	
Crooked Iſland N. point	22	56		74	12	
Atkins Key	22	17		74	05	
Meraparvouz	21	58		74	45	
Atwoods Key	23	10		73	35	
French Keys	22	40		73	40	
Mayaguana	22	35		72	46	
Hogſties	21	17		73	55	

A TABLE of Latitudes and Longitudes.

Places Names.	Latitude		Longitude	
Bahama Iſlands.	D.	M.	D.	M.
Heneago	20	52 N	73	46W
Caicos Bank N. Point	21	50 N	71	15W
Turks Iſland	21	35 N	70	08W
Abrolho N. point	21	35 N	69	06W
Plate Wreck	20	10 N	68	15W
The Coaſt of *Carolina, Virginia, Maryland, Penſilvania, New-England,* and *Newfoundland.*				
Charles Town upon Aſhly River	32	45	78	46
Cape Hatteras	35	15	74	20
Cape Henry	37	00	75	24
Cape Charles	37	16	74	16
Cape Hinlopen	38	50	74	56
Long Iſland	40	50	72	45
New York	40	58	73	53
Cape Cod	42	12	68	55
Boſton	42	30	69	23
Cape Sable	43	50	64	58
Iſle Sable	44	20	59	01
Cape Britain	46	00	58	30
Quebec	46	55	69	48
Bay of Breſt	52	10	56	57
Bell Iſland	52	07	55	35
Cape St. John	50	15	52	48
Cape Bonaviſta	49	15	52	12
Trinity Bay Entr.	48	42	52	20
Conception Bay	48	20	52	08
St. John's Harbour	48	00	51	39
Bay of Bulls	47	50	51	29
Cape Race	46	40	51	52
Cape St. Mary	47	10	53	23
Placentia	47	45	53	58
Cape Roy	48	00	57	40

North Latitude. Weſt Longitude.

Places Names.	Latitude		Longitude	
The Coaſt of *Hudſon's Bay* and *Straits.*	D.	M.	D.	M.
Buttons Iſle	60	25	66	27
Cape Charles	62	10	75	35
Cape Walſingham	62	35	77	55
Mansfield Iſle	61	42	80	30
Cape Jones	54	55	78	58
Ruperts River	51	30	79	26
Albany River	52	26	84	50
The Cubbs	54	10	82	40
C. Henrietta Maria	55	07	84	30
Port Nelſon	57	10	93	58
Cape Churchill	59	00	95	20
Cape Southampton	61	55	86	48
Shark Point	64	30	82	55
Nottingham Iſle	63	30	79	53
Q. Ann's Foreland	63	48	74	45
Reſolution Iſle	61	50	65	04
Cape Farewell	59	45	46	45
The Coaſt of *Iceland, Greenland, Nova Zembla,* and Northern Iſles.				
Sound Royal	66	22	14	33
Bargazar point	66	20	16	35
Whales Back	65	27	20	33
Merchants Foreland	63	25	17	05
Halliford	64	30	34	43
Fair Foreland	66	20	26	27
Grims Iſland	67	15	22	34
Weſtmania Iſles	63	30	22	24
Iſles of Fero	62	06	05	00
Beerenberg, or John Main's Iſle	71	45	04	30 E
Point Look-out	76	25	15	36 E
Horn Sound	76	45	13	36 E
Fair Foreland	79	20	10	52 E
Hacluits Foreland	79	55	11	00 E
Helie's Sound	78	55	21	50 E

North Latitude. Weſt Longitude.

A TABLE of Latitudes and Longitudes.

Places Names.	Latitude		Longitude	
The Coaſt of *Iceland*, *Greenland*, *Nova-Zembla*, and Northern Iſles.	D.	M.	D.	M.
Lees Foreland	78	05	23	25
Whales Head	77	18	21	30
Hope Iſland	76	18	23	45
Cherry or Bear Iſle	74	30	18	08
Admiralty Iſle	75	05	54	50
Fretum Borough	70	00	61	20
Cape Candinoſe	69	05	42	35
Catnoſe	65	43	35	14
Archangle Bar	64	30	40	30
Croſs Iſland	66	31	36	33
Sweetnoſe	68	10	34	45
Kilduyn	69	30	31	20
North Cape	71	23	23	02
Surroy	71	05	16	40
Tromſound	70	25	15	30
Lœfort SW. point	68	15	09	30
Dronton	63	50	10	15
Stadland	62	10	04	38
North Bergen	60	10	05	40
Naze of Norway	57	45	07	24

North Latitude. East Longitude.

The Coaſt in the *Sound* and *Baltick*.				
Mardou	58	19 N	08	57 E
Larwick	58	54 N	09	20 E
Chriſtiana	59	20 N	10	00 E
Maeſterland	57	53 N	11	45 E

Places Names.	Latitude		Longitude	
	D.	M.	D.	M.
Gottenburgh	57	50	12	15
Elſinore	56	22	12	42
Copenhagen	55	41	12	50
Valſterborn	55	28	13	00
Kalmer	56	40	16	35
Stockholm	59	20	19	30
Wybourg	60	52	29	16
Peterſburg	60	00	30	25
Narva	59	17	28	25
Revel	59	25	24	51
Riga	57	04	25	15
Derwinda	57	15	22	06
Koningſberg	54	43	21	35
Dantzick	54	22	18	36
Wiſby in Gotland	57	30	18	30
Bornholm	55	15	14	45
Straelſound	54	25	13	16
Lubeck	54	06	09	55
Anout	56	50	11	06
Leſou	57	05	10	30
Scaw	57	30	10	20

North Latitude. East Longitude.

The Latitudes of any two Places being given, to find the Difference of Latitude between them.

Rule, If the Latitudes are both North, or both South, ſubtract the Leſſer from the Greater, the Remainder will be the Difference of Latitude.

But

But if one Latitude be North, and the other South, then add them together, and their Sum will be the Difference of Latitude.

Example 1ſt. What is the Difference of Latitude between the *Lizard* and *Barbadoes*.

Lizard, in Latitude — — —	49° 57′	N.
Barbadoes, in Latitude — — —	12 58	N.
The Difference of Latitude — —	36 59	

Example 2d. What is the Difference of Latitude between *Jamaica* and Cape *Bona Eſperance*.

Jamaica, in Latitude — — —	17 40	N.
Cape *Bona Eſperance*, in Latitude —	34 07	S.
The Difference of Latitude — —	51 47	which Degrees

being multiplied by 60, and the odd 47 Min. 60
taken in, will give the Difference of Lat. in 3107 Miles.

Rules for Latitude.

The Latitude ſail'd from, and the Difference of Latitude being given, to find what Latitude the Ship is come into?

Caſe the 1ſt. When you ſail from North Latitude to the Northward, or from South Latitude to the Southward, add the Difference of Latitude (it being firſt brought into Degrees, if need be, by dividing it by 60) to the Latitude ſail'd from, the Sum will be the Latitude you are come into, of the ſame Name with the Latitude ſail'd from.

Example 1ſt. A Ship from a Place in the Latitude 14 10 N. ſails to the Northward till ſhe makes her Difference of Latitude 04 21: What Latitude is ſhe come into?

Latitude ſail'd from — — — —	14 10	N.
Difference of Latitude — — —	04 21	
Latitude come into — — —	18 31	N.

Example 2d. A Ship from Latitude 29 17 S. ſails to the Southward, till ſhe makes her Difference of Latitude 374 Miles: What Latitude is ſhe come into?

Latitude ſail'd from — — — — —	29 17	S.
Diff. of Lat. 374 Miles, divided by 60 makes	06 14	
Latitude come into — — — — —	35 31	S.

Caſe the 2d. When you ſail from North Latitude to the Southward, or from South Latitude to the Northward, ſubtract the Difference of Latitude, if leaſt, from the Latitude ſail'd from, the Remainder is the Latitude come into, of the ſame Name with the Latitude you ſail'd from.

But if the Difference of Latitude be biggeſt, then ſubtract the Latitude from the Difference of Latitude, the Remainder will be the Latitude come into, of a contrary Name to the Latitude you ſail'd from.

Example 1ſt. A Ship from Latitude 49 14 N. ſails to the Southward, till her Difference of Latitude be 521 Miles: What Latitude is ſhe come into?

Latitude ſail'd from — — — — — —	49 14 N.
Diff. of Lat. 521 Miles, divided by 60, makes	08 41
Latitude come into — — — — — —	40 33 N.

Example 2. A Ship from Latitude 4 18 S. ſails to the Northward, till her Difference of Latitude be 10 24: What Latitude is ſhe come into?

Latitude ſail'd from — — — —	04 18 S.
Difference of Latitude — — —	10 24
Latitude come into — — — —	06 06 N.

Rules for Longitude.

The Longitudes of any two Places being given, to find the Difference of Longitude between them.

Rule. If the Longitudes are both Eaſt, or both Weſt, ſubtract the leſſer from the greater, the Remainder will be the Difference of Longitude.

But if one Longitude be Eaſt, and the other Weſt, then add them together, and their Sum (if leſs than 180 Degrees) will be the Difference of Longitude; but if it be more than 180 Degrees, then ſubtract it from 360.00, and the Remainder will be the Difference of Longitude.

Example 1ſt. What is the Difference of Longitude, between Cape *Finiſter* and *Antigua?*

Cape

Cape *Finiſter*, in Longitude —— 09 40 W.
Antigua, in Longitude —— —— 61 45 W.
The Difference of Longitude — 52 05

Example 2d. What is the Difference of Longitude between *Barcelona* and the Rock of *Liſbon?*

Barcelona, in Longitude— —— 02 18 E.
Rock of *Liſbon*, in Longitude — 09 50 W.
The Difference of Longitude— 12 08

Example 3d. What is the Difference of Longitude between the S.E. Point of *Japan*, and the Iſland of St. *Chriſtophers.*

SE. Point of *Japan*, in Longitude —— 140 30 E.
St. *Chriſtopher's*, in Longitude ——— 62 40 W.
Exceeds 180.00 —— 203 10
Subtract it from —— 360 00
Remains the Difference of Longitude ——— 156 50

The Longitude ſail'd from, and the Difference of Longitude being given, to find what Longitude the Ship is come into?

Caſe 1ſt. When you ſail from Eaſt Longitude to the Eaſtward, or from Weſt Longitude to the Weſtward, add the Difference of Longitude to the Longitude ſail'd from, the Sum (if leſs than 180 Degrees) is the Longitude come into, of the ſame Name with the Longitude you ſail'd from.

But if the Sum ſhould be more than 180 Degrees, then ſubtract it from 360.00, and the Remainder will be the Longitude you are come into, of a contrary Name to the Longitude you ſail'd from.

Example 1ſt. A Ship from Longitude of 48 21 E. ſails to the Eaſtward, till ſhe makes her Difference of Longitude 287 Miles: What Longitude is ſhe come into?

Longitude ſail'd from — — — 48 21 E.
Difference of Longitude 287 Miles, or 04 47
Longitude come into — — — 53 08 E.

Example 2d. A Ship from the Longitude of 178 47: Weſt, ſails to the Weſtward till her Difference of Longitude be 12 17: What Longitude is ſhe come into?

Longitude ſail'd from —— ——	178 47 W.
Difference of Longitude —— ——	12 17
Exceeds 180.00 ——	191 04
Subtract it from ——	360 00
Remains the Longitude come into—	168 56 E.

Caſe the 2d. When you ſail from Eaſt Longitude to the Weſtward, or from Weſt Longitude to the Eaſtward, ſubtract the Difference of Longitude (if it be leaſt) from the Longitude you ſail'd from, and the Remainder will be the Longitude come into, of the ſame Name with the Longitude ſail'd from.

But if the Difference of Longitude be the biggeſt, then ſubtract the Longitude, from the Difference of Longitude, and the Remainder will be the Longitude come into, of a contrary Name to the Longitude ſail'd from.

Example 1ſt. A Ship from Longitude 98 17 Eaſt, ſails to the Weſtward till ſhe makes her Difference of Longitude 14 21: What Longitude is ſhe come into?

Longitude ſail'd from —— ——	98 17 E.
Difference of Longitude —— ——	14 21
Longitude come into — —— ——	83 56 E.

Example 2d. A Ship from Longitude 44 21 Weſt, ſails to the Eaſtward till her Difference of Longitude be 81 42: What Longitude is ſhe come into?

Longitude ſail'd from —— ——	44 21 W.
Difference of Longitude—— ——	81 42
Longitude come into —— ——	37 21 E.

Here follows a Table of Meridional Parts, to every Degree and Minute of Latitude.

M	0 d	1 d	2 d	3 d	4 d	5 d	6 d	7 d	8 d	9 d	10 d	11 d	12 d	13 d	M
0	0	60	120	180	240	300	361	421	482	542	603	664	725	787	0
1	1	61	121	181	241	301	362	422	483	543	604	665	726	788	1
2	2	62	122	182	242	302	363	423	484	544	605	666	727	789	2
3	3	63	123	183	243	303	364	424	485	545	606	667	728	790	3
4	4	64	124	184	244	304	365	425	486	546	607	668	729	791	4
5	5	65	125	185	245	305	366	426	487	547	608	669	730	792	5
6	6	66	126	186	246	306	367	427	488	548	609	670	731	793	6
7	7	67	127	187	247	307	368	428	489	549	610	671	732	794	7
8	8	68	128	188	248	308	369	429	490	550	611	672	733	795	8
9	9	69	129	189	249	309	370	430	491	551	612	673	735	796	9
10	10	70	130	190	250	310	371	431	492	552	613	674	736	797	10
11	11	71	131	191	251	311	372	432	493	553	614	675	737	798	11
12	12	72	132	192	252	312	373	433	494	554	615	676	738	799	12
13	13	73	133	193	253	313	374	434	495	555	616	677	739	800	13
14	14	74	134	194	254	314	375	435	496	556	617	678	740	801	14
15	15	75	135	195	255	315	376	436	497	557	618	679	741	802	15
16	16	76	136	196	256	316	377	437	498	558	619	680	742	803	16
17	17	77	137	197	257	317	378	438	499	559	620	681	743	804	17
18	18	78	138	198	258	318	379	439	500	560	621	682	744	805	18
19	19	79	139	199	259	319	380	440	501	561	622	683	745	806	19
20	20	80	140	200	260	320	381	441	502	562	623	684	746	807	20
21	21	81	141	201	261	321	382	442	503	563	624	685	747	808	21
22	22	82	142	202	262	322	383	443	504	564	625	686	748	809	22
23	23	83	143	203	263	323	384	444	505	566	626	688	749	810	23
24	24	84	144	204	264	324	385	445	506	567	627	689	750	811	24
25	25	85	145	205	265	325	386	446	507	568	628	690	751	812	25
26	26	86	146	206	266	326	387	447	508	569	629	691	752	813	26
27	27	87	147	207	267	327	388	448	509	570	630	692	753	814	27
28	28	88	148	208	268	328	389	449	510	571	632	693	754	816	28
29	29	89	149	209	269	329	390	450	511	572	633	694	755	817	29
30	30	90	150	210	270	330	391	451	512	573	634	695	756	818	30
31	31	91	151	211	271	332	392	452	513	574	635	696	757	819	31
32	32	92	152	212	272	333	393	453	514	575	636	697	758	820	32
33	33	93	153	213	273	334	394	454	515	576	637	698	759	821	33
34	34	94	154	214	274	335	395	455	516	577	638	699	760	822	34
35	35	95	155	215	275	336	396	456	517	578	639	700	761	823	35
36	36	96	156	216	276	337	397	457	518	579	640	701	762	824	36
37	37	97	157	217	277	338	398	458	519	580	641	702	763	825	37
38	38	98	158	218	278	339	399	459	520	581	642	703	764	826	38
39	39	99	159	219	279	340	400	460	521	582	643	704	765	827	39
40	40	100	160	220	280	341	401	461	522	583	644	705	766	828	40
41	41	101	161	221	281	342	402	462	523	584	645	706	767	829	41
42	42	102	162	222	282	343	403	463	524	585	646	707	768	830	42
43	43	103	163	223	283	344	404	464	525	586	647	708	769	831	43
44	44	104	164	224	284	345	405	465	526	587	648	709	770	832	44
45	45	105	165	225	285	346	406	466	527	588	649	710	771	833	45
46	46	106	166	226	286	347	407	467	528	589	650	711	772	834	46
47	47	107	167	227	287	348	408	468	529	590	651	712	773	835	47
48	48	108	168	228	288	349	409	469	530	591	652	713	774	836	48
49	49	109	169	229	289	350	410	470	531	592	653	714	775	837	49
50	50	110	170	230	290	351	411	471	532	593	654	715	776	838	50
51	51	111	171	231	291	352	412	472	533	594	655	716	777	839	51
52	52	112	172	232	292	353	413	473	534	595	656	717	779	840	52
53	53	113	173	233	293	354	414	474	535	596	657	718	780	841	53
54	54	114	174	234	294	355	415	475	536	597	658	719	781	842	54
55	55	115	175	235	295	356	416	477	537	598	659	720	782	843	55
56	56	116	176	236	296	357	417	478	538	599	660	721	783	844	56
57	57	117	177	237	297	358	418	479	539	600	661	722	784	845	57
58	58	118	178	238	298	359	419	480	540	601	662	723	785	846	58
59	59	119	179	239	299	360	420	481	541	602	663	724	786	847	59

M	14 d	15 d	16 d	17 d	18 d	19 d	20 d	21 d	22 d	23 d	24 d	25 d	26 d	27 d	M
0	848	910	973	1035	1098	1161	1225	1289	1354	1419	1484	1550	1616	1684	0
1	849	911	974	36	99	63	26	90	55	20	85	51	18	85	1
2	851	913	975	37	1100	64	27	91	56	21	86	52	19	86	2
3	852	914	976	38	01	65	28	92	57	22	87	53	20	87	3
4	853	915	977	39	02	66	29	93	58	23	88	54	21	88	4
5	854	916	978	41	03	67	30	95	59	24	90	56	22	89	5
6	855	917	979	42	05	68	32	96	60	25	91	57	23	90	6
7	856	918	980	43	06	69	33	97	61	26	92	58	24	91	7
8	857	919	981	44	07	70	34	98	62	27	93	59	25	93	8
9	858	920	982	45	08	71	35	99	63	28	94	60	26	94	9
10	859	921	983	1046	1109	1172	1236	1300	1364	1429	1495	1561	1628	1695	10
11	860	922	984	47	10	73	37	01	66	31	96	62	29	96	11
12	861	923	985	48	11	74	38	02	67	32	97	63	30	97	12
13	862	924	986	49	12	75	39	03	68	33	98	64	31	98	13
14	863	925	987	50	13	76	40	04	69	34	99	65	32	99	14
15	864	926	988	51	14	77	41	05	70	35	1500	67	33	1700	15
16	865	927	989	52	15	78	42	06	71	36	02	68	34	01	16
17	866	928	990	53	16	79	43	07	72	37	03	69	35	03	17
18	867	929	991	54	17	81	44	08	73	38	04	70	37	04	18
19	868	930	992	55	18	82	45	10	74	39	05	71	38	05	19
20	869	931	994	1056	1119	1183	1246	1311	1375	1440	1506	1572	1639	1706	20
21	870	932	995	57	20	84	48	12	76	41	07	73	40	07	21
22	871	933	996	58	21	85	49	13	77	43	08	74	41	08	22
23	872	934	997	59	22	86	50	14	79	44	09	75	42	09	23
24	873	935	998	60	23	87	51	15	80	45	10	77	43	10	24
25	874	936	999	61	25	88	52	16	81	46	11	78	44	12	25
26	875	937	1000	63	26	89	53	17	82	47	13	79	45	13	26
27	876	938	1001	64	27	90	54	18	83	48	14	80	47	14	27
28	877	939	1002	65	28	91	55	19	84	49	15	81	48	15	28
29	878	941	1003	66	29	92	56	20	85	50	16	82	49	16	29
30	879	942	1004	1067	1130	1193	1257	1321	1386	1451	1517	1583	1650	1717	30
31	880	943	05	68	31	94	58	22	87	52	18	84	51	18	31
32	881	944	06	69	32	95	59	24	88	53	19	85	52	20	32
33	883	945	07	70	33	96	60	25	89	55	20	86	53	21	33
34	884	946	08	71	34	97	61	26	90	56	21	88	54	22	34
35	885	947	09	72	35	99	62	27	92	57	22	89	56	23	35
36	886	948	10	73	36	1200	64	28	93	58	24	90	57	24	36
37	887	949	11	74	37	01	65	29	94	59	25	91	58	25	37
38	888	950	12	75	38	02	66	30	95	60	26	92	59	26	38
39	889	951	13	76	39	03	67	31	96	61	27	93	60	27	39
40	890	952	1014	1077	1140	1204	1268	1332	1397	1462	1528	1594	1661	1729	40
41	891	953	15	78	41	05	69	33	98	63	29	95	62	30	41
42	892	954	16	79	42	06	70	34	99	64	30	96	63	31	42
43	893	955	18	80	44	07	71	35	1400	65	31	98	64	32	43
44	894	956	19	81	45	08	72	36	01	67	32	99	66	33	44
45	895	957	20	82	46	09	73	38	02	68	33	1600	67	34	45
46	896	958	21	83	47	10	74	39	03	69	35	01	68	35	46
47	897	959	22	85	48	11	75	40	05	70	36	02	69	36	47
48	898	960	23	86	49	12	76	41	06	71	37	03	70	38	48
49	899	961	24	87	50	13	77	42	07	72	38	04	71	39	49
50	900	962	1025	1088	1151	1214	1278	1343	1408	1473	1539	1605	1672	1740	50
51	901	963	26	89	52	16	80	44	09	74	40	06	73	41	51
52	902	964	27	90	53	17	81	45	10	75	41	08	75	42	52
53	903	965	28	91	54	18	82	46	11	76	42	09	76	43	53
54	904	966	29	92	55	19	83	47	12	77	43	10	77	44	54
55	905	968	30	93	56	20	84	48	13	79	44	11	78	45	55
56	906	969	31	94	57	21	85	49	14	80	46	12	79	47	56
57	907	970	32	95	58	22	86	50	15	81	47	13	80	48	57
58	908	971	33	96	59	23	87	52	16	82	48	14	81	49	58
59	909	972	34	97	60	24	88	53	18	83	49	15	82	50	59

M	28 d	29 d	30 d	31 d	32 d	33 d	34 d	35 d	36 d	37 d	38 d	39 d	40 d	41 d	M
0	1751	1819	1888	1958	2028	2100	2171	2244	2318	2393	2468	2545	2623	2702	0
1	52	21	90	59	30	01	73	45	19	94	70	46	24	03	1
2	53	22	91	60	31	02	74	47	20	95	71	48	25	04	2
3	55	23	92	62	32	03	75	48	22	96	72	49	27	06	3
4	56	24	93	63	33	04	76	49	23	98	73	50	28	07	4
5	57	25	94	64	34	05	78	50	24	99	75	51	29	08	5
6	58	26	95	65	35	07	79	52	25	2400	76	53	31	10	6
7	59	27	96	66	37	08	80	53	27	01	77	54	32	11	7
8	60	29	98	67	38	09	81	54	28	03	78	55	33	12	8
9	61	30	99	69	39	10	82	55	29	04	80	57	34	14	9
10	1762	1831	1900	1970	2040	2111	2184	2256	2330	2405	2481	2558	2636	2715	10
11	64	32	01	71	41	13	85	58	32	06	82	59	37	16	11
12	65	33	02	72	43	14	86	59	33	08	84	60	38	18	12
13	66	34	03	73	44	15	87	60	34	09	85	62	40	19	13
14	67	35	05	74	45	16	88	61	35	10	86	63	41	20	14
15	68	37	06	76	46	17	90	63	37	11	87	64	42	22	15
16	69	38	07	77	47	19	91	64	38	13	89	66	44	23	16
17	70	39	08	78	48	20	92	65	39	14	90	67	45	24	17
18	72	40	09	79	50	21	93	66	40	15	91	68	46	26	18
19	73	41	10	80	51	22	94	68	42	16	92	69	48	27	19
20	1774	1842	1911	1981	2052	2123	2196	2269	2343	2418	2494	2571	2649	2728	20
21	75	43	13	83	53	25	97	70	44	19	95	72	50	29	21
22	76	45	14	84	54	26	98	71	45	20	96	73	51	31	22
23	77	46	15	85	56	27	99	72	46	21	98	75	53	32	23
24	78	47	16	86	57	28	2200	74	48	23	99	76	54	33	24
25	80	48	17	87	58	29	02	75	49	24	2500	77	55	35	25
26	81	49	18	88	59	31	03	76	50	25	01	78	57	36	26
27	82	50	20	90	60	32	04	77	51	27	03	80	58	37	27
28	83	52	21	91	61	33	05	79	53	28	04	81	59	39	28
29	84	53	22	92	63	34	07	80	54	29	05	82	61	40	29
30	1785	1854	1923	1993	2064	2135	2208	2281	2355	2430	2506	2584	2662	2742	30
31	86	55	24	94	65	37	09	82	56	32	08	85	63	43	31
32	87	56	25	95	66	38	10	83	58	33	09	86	65	44	32
33	89	57	27	97	67	39	11	85	59	34	10	88	66	46	33
34	90	58	28	98	69	40	13	86	60	35	12	89	67	47	34
35	91	60	29	99	70	41	14	87	61	37	13	90	69	48	35
36	92	61	30	2000	71	43	15	88	63	38	14	91	70	50	36
37	93	62	31	01	72	44	16	90	64	39	15	93	71	51	37
38	94	63	32	02	73	45	17	91	65	40	17	94	73	52	38
39	95	64	34	04	75	46	19	92	66	42	18	95	74	54	39
40	1797	1865	1935	2005	2076	2147	2220	2293	2368	2443	2519	2597	2675	2755	40
41	98	66	36	06	77	49	21	95	69	44	21	98	76	56	41
42	99	68	37	07	78	50	22	96	70	45	22	99	78	58	42
43	1800	69	38	08	79	51	24	97	71	47	23	2601	79	59	43
44	01	70	39	10	80	52	25	98	73	48	24	02	80	60	44
45	02	71	41	11	82	53	26	99	74	49	26	03	82	62	45
46	03	72	42	12	83	55	27	2301	75	51	27	04	83	63	46
47	05	73	43	13	84	56	28	02	76	52	28	06	84	64	47
48	06	75	44	14	85	57	30	03	78	53	30	07	86	66	48
49	07	76	45	15	86	58	31	04	79	54	31	08	87	67	49
50	1808	1877	1946	2017	2088	2159	2232	2306	2380	2456	2532	2610	2688	2768	50
51	09	78	48	18	89	61	33	07	81	57	33	11	90	70	51
52	10	79	49	19	90	62	35	08	83	58	35	12	91	71	52
53	11	80	50	20	91	63	36	09	84	59	36	14	92	72	53
54	13	81	51	21	92	64	37	11	85	61	37	15	94	74	54
55	14	83	52	22	94	65	38	12	86	62	38	16	95	75	55
56	15	84	53	24	95	67	39	13	88	63	40	17	96	76	56
57	16	85	55	25	96	68	41	14	89	64	41	19	98	78	57
58	17	86	56	26	97	69	42	16	90	66	42	20	99	79	58
59	18	87	57	27	98	70	43	17	91	67	44	21	2700	80	59

M	42 d	43 d	44 d	45 d	46 d	47 d	48 d	49 d	50 d	51 d	52 d	53 d	54 d	55 d	M
0	2782	2863	2946	3030	3116	3203	3292	3382	3474	3569	3665	3764	3865	968	0
1	83	64	47	31	17	04	93	84	76	70	67	65	66	70	1
2	84	66	49	33	18	06	95	85	78	72	68	67	68	71	2
3	86	67	50	34	20	07	96	87	79	74	70	69	70	73	3
4	87	69	51	36	21	09	98	88	81	75	72	70	71	75	4
5	88	70	53	37	23	10	99	90	82	77	73	72	73	77	5
6	90	71	54	38	24	12	3301	91	84	78	75	74	75	78	6
7	91	73	56	40	26	13	02	93	85	80	77	75	77	80	7
8	92	74	57	41	27	14	03	94	87	82	78	77	78	82	8
9	94	75	58	43	29	16	05	96	88	83	80	79	80	84	9
10	2795	2877	2960	3044	3130	3217	3306	3397	3490	3585	3681	3780	3882	3985	10
11	97	78	61	46	31	19	08	99	92	86	83	82	83	87	11
12	98	80	63	47	33	20	09	3400	93	88	85	84	85	89	12
13	99	81	64	48	34	22	11	02	95	90	86	85	87	91	13
14	2801	82	65	50	36	23	12	03	96	91	88	87	89	92	14
15	02	84	67	51	37	25	14	05	98	93	90	89	90	94	15
16	03	85	68	53	39	26	16	07	99	94	91	90	92	96	16
17	05	86	70	54	40	28	17	08	3501	96	93	92	94	98	17
18	06	88	71	55	42	29	19	10	03	98	95	94	95	99	18
19	07	89	72	57	43	31	20	11	04	99	96	95	97	4001	19
20	2809	2891	2974	3058	3144	3232	3322	3413	3506	3601	3698	3797	99	4003	20
21	10	92	75	60	46	34	23	14	07	02	99	99	3901	05	21
22	11	93	76	61	47	35	25	16	09	04	3701	3800	02	05	22
23	13	95	78	63	49	37	26	17	10	06	03	02	04	08	23
24	14	96	79	64	50	38	28	19	12	07	04	04	06	10	24
25	15	97	81	65	52	40	29	20	14	09	06	06	07	12	25
26	17	99	82	67	53	41	31	22	15	10	08	07	09	14	26
27	18	2900	83	68	55	42	32	23	17	12	09	09	11	15	27
28	20	02	85	70	56	44	34	25	18	14	11	11	13	17	28
29	21	03	86	71	57	45	35	27	20	15	13	12	14	19	29
30	2822	2904	2988	3073	3159	3247	3337	3428	3521	3617	3714	3814	3916	4021	30
31	24	06	89	74	60	48	38	30	23	18	16	16	18	22	31
32	25	07	91	75	62	50	40	31	25	20	17	17	19	24	32
33	26	08	92	77	63	51	41	33	26	22	19	19	21	26	33
34	28	10	93	78	65	53	43	34	28	23	21	21	23	28	34
35	29	11	95	80	66	54	44	36	29	25	22	22	25	29	35
36	30	13	96	81	68	56	46	37	31	26	24	24	26	31	36
37	32	14	98	83	69	57	47	39	32	28	26	26	28	33	37
38	33	15	99	84	71	59	49	40	34	30	27	27	30	35	38
39	34	17	3000	85	72	60	50	42	36	31	29	29	32	37	39
40	2836	2918	3002	3087	3173	3262	3352	3443	3537	3633	3731	3831	3933	4038	40
41	37	19	03	88	75	63	53	45	39	34	32	32	35	40	41
42	39	21	05	90	76	65	55	47	40	36	34	34	37	42	42
43	40	22	06	91	78	66	56	48	42	38	36	36	38	44	43
44	41	24	07	93	79	68	58	50	43	39	37	38	40	45	44
45	43	25	09	94	81	69	59	51	45	41	39	39	42	47	45
46	44	26	10	95	82	71	61	53	47	43	41	41	44	49	46
47	45	28	12	97	84	72	62	54	48	44	42	43	45	51	47
48	47	29	13	98	85	74	64	56	50	46	44	44	47	52	48
49	48	31	14	3100	87	75	65	57	51	47	46	46	49	54	49
50	2849	2932	3016	3101	3188	3277	3367	3459	3553	3649	3747	3848	3951	4056	50
51	51	33	17	03	90	78	68	60	55	51	49	49	52	58	51
52	52	35	19	04	91	80	70	62	56	52	50	51	54	60	52
53	54	36	20	05	92	81	71	64	58	54	52	53	56	61	53
54	55	37	21	07	94	83	73	65	59	55	54	54	58	63	54
55	56	39	23	08	95	84	74	67	60	57	55	56	59	65	55
56	58	40	24	10	97	86	76	68	62	59	57	58	61	67	56
57	59	42	26	11	98	87	78	70	64	60	59	60	63	69	57
58	60	43	27	13	3200	89	79	71	65	62	60	61	64	70	58
59	62	44	28	14	01	90	81	73	67	64	62	63	66	72	59

M	56 d	57 d	58 d	59 d	60 d	61 d	62 d	63 d	64 d	65 d	66 d	67 d	68 d	69 d	M
0	4074	4183	4294	4409	4527	4649	4775	4905	5039	5179	5324	5474	5631	5795	0
1	76	84	96	11	29	51	77	07	42	81	26	77	33	97	1
2	77	86	98	13	31	53	79	09	44	84	28	79	36	5800	2
3	79	88	4300	15	33	55	81	12	46	86	31	82	39	03	3
4	81	90	02	17	35	57	84	14	49	88	33	84	42	06	4
5	83	92	04	19	37	60	86	16	51	91	36	87	44	09	5
6	85	94	06	21	39	62	88	18	53	93	38	89	47	11	6
7	86	95	08	23	41	64	90	20	55	95	41	92	50	14	7
8	88	97	09	25	43	66	91	23	58	98	43	95	52	17	8
9	90	99	11	27	45	68	94	25	60	5200	46	97	55	20	9
10	4092	4201	4313	4429	4547	4670	4796	4927	5062	5203	5348	5500	5658	5823	10
11	94	03	15	31	49	72	98	29	65	05	51	02	60	25	11
12	95	05	17	33	51	74	4801	31	67	07	53	05	63	28	12
13	97	07	19	34	53	76	03	34	69	10	56	07	66	31	13
14	99	08	20	35	55	78	05	36	71	12	58	10	68	34	14
15	4101	10	23	38	57	80	07	38	74	14	61	13	71	37	15
16	03	12	25	40	59	82	09	40	76	17	63	15	74	39	16
17	04	14	27	42	62	84	11	43	78	19	66	18	76	42	17
18	06	16	28	44	64	87	14	45	81	22	68	20	79	45	18
19	08	18	30	46	66	89	16	47	83	24	71	23	82	48	19
20	4110	4220	4332	4448	4568	4691	4818	4949	5085	5226	5373	5526	5685	5851	20
21	12	21	34	50	70	93	20	51	88	29	76	28	87	54	21
22	13	23	36	52	72	95	22	54	90	31	78	31	90	56	22
23	15	25	38	54	74	97	24	56	92	34	80	33	93	59	23
24	17	27	40	56	76	99	26	58	95	36	83	36	95	62	24
25	19	29	42	58	78	4701	29	60	97	38	85	39	98	65	25
26	21	31	44	60	80	03	31	63	99	41	88	41	5701	68	26
27	22	32	46	62	82	05	33	65	5102	43	90	44	04	71	27
28	24	34	47	64	84	07	35	67	04	46	93	46	06	74	28
29	26	36	49	66	86	10	37	69	06	48	95	49	09	76	29
30	4128	4238	4351	4468	4588	4712	4839	4972	5101	5250	5398	5552	5712	5879	30
31	30	40	53	70	90	14	42	74	11	53	5401	54	15	82	31
32	32	42	55	72	92	16	44	76	13	55	03	57	17	85	32
33	33	44	57	74	94	18	46	78	15	58	06	59	20	88	33
34	35	46	59	76	96	20	48	81	18	60	08	62	23	91	34
35	37	47	61	78	98	22	50	83	20	63	11	65	25	94	35
36	39	49	63	80	4500	24	52	85	22	65	13	67	28	96	36
37	41	51	65	82	02	26	55	87	25	67	16	70	31	99	37
38	42	53	67	84	04	28	57	90	27	70	18	73	34	5902	38
39	44	55	69	86	07	31	59	92	29	72	21	75	36	05	39
40	4146	4257	4370	4488	4608	4733	4861	4994	5132	5275	5423	5578	5735	5908	40
41	48	59	72	90	10	35	63	96	34	77	26	80	42	11	41
42	50	60	74	92	12	37	65	99	36	80	28	83	45	14	42
43	52	62	76	94	14	39	68	5001	39	82	31	86	47	17	43
44	53	64	78	95	16	41	70	03	41	84	33	88	50	19	44
45	55	66	80	97	18	43	72	05	43	87	36	91	53	22	45
46	57	68	82	99	20	45	74	08	46	89	38	94	56	25	46
47	59	70	84	4501	23	47	76	10	48	92	41	96	58	28	47
48	61	72	86	03	25	50	79	12	51	94	43	99	61	31	48
49	62	74	88	05	27	52	81	14	53	97	46	5602	64	34	49
50	4164	4275	4390	4507	4629	4754	4883	5017	5155	5299	5448	5604	5767	5937	50
51	66	77	92	09	31	56	85	19	58	5301	51	07	70	40	51
52	68	79	94	11	33	58	87	21	60	04	54	10	72	43	52
53	70	81	96	13	35	60	90	23	62	06	56	12	75	46	53
54	72	83	98	15	37	62	92	26	65	09	59	15	78	48	54
55	73	85	99	17	39	64	94	28	67	11	61	17	81	51	55
56	75	87	4401	19	41	66	96	30	69	14	64	20	83	54	56
57	77	89	03	21	43	69	98	33	72	16	66	23	86	57	57
58	79	91	05	23	45	71	4901	35	74	19	69	25	89	60	58
59	81	92	07	25	47	73	03	37	76	21	71	28	92	63	59

M	70 d	71 d	72 d	73 d	74 d	75 d	76 d	77 d	88 d	79 d	80 d	81 d	82 d	83 d	M
0	5966	6146	6335	6534	6746	6970	7210	7467	7745	8046	8375	8739	9145	9606	0
1	69	49	38	38	49	74	14	72	49	51	81	45	53	14	1
2	72	52	41	41	53	78	18	76	54	56	87	52	60	22	2
3	75	55	45	45	57	82	22	81	59	61	93	58	67	31	3
4	78	58	48	49	60	86	27	85	64	67	98	65	74	39	4
5	81	61	51	52	64	90	31	90	69	72	8404	71	82	47	5
6	84	64	54	55	68	94	35	94	74	77	10	78	89	55	6
7	86	67	58	58	71	97	39	98	78	83	16	84	96	64	7
8	89	70	61	62	75	7001	43	7503	83	88	22	91	9203	72	8
9	92	73	64	65	79	05	47	07	88	93	27	97	11	80	9
10	5995	6177	6367	6569	6782	7009	7252	7512	7793	8099	8433	8804	9218	9689	10
11	98	80	71	72	86	13	56	16	98	8104	39	10	25	97	11
12	6001	83	74	76	90	17	60	21	7803	07	45	17	33	9706	12
13	04	86	77	79	93	21	64	25	08	15	51	23	40	14	13
14	07	89	80	83	97	25	68	30	13	20	57	30	48	23	14
15	10	92	84	86	6801	29	73	35	17	25	63	36	55	31	15
16	13	95	87	90	04	33	77	39	22	31	69	43	67	40	16
17	16	98	90	93	08	37	81	44	27	36	74	49	76	48	17
18	19	6201	94	97	12	41	85	48	32	41	80	56	77	57	18
19	22	05	97	5600	15	45	89	53	37	47	86	63	85	65	19
20	6025	6208	6400	5603	6819	7048	7294	7557	7842	8152	8492	8869	9292	9774	20
21	28	11	03	07	23	52	98	62	47	58	98	76	9300	83	21
22	31	14	07	10	26	56	7302	66	52	63	8504	83	07	91	22
23	34	17	10	14	30	60	06	71	57	68	10	89	15	9800	23
24	37	20	13	17	34	64	11	76	62	74	16	96	22	09	24
25	40	23	17	21	38	68	15	80	67	79	22	8903	30	17	25
26	43	26	2	24	41	72	19	85	72	85	28	09	37	26	26
27	46	30	23	28	45	76	23	89	77	90	34	16	45	35	27
28	49	33	27	31	49	80	28	94	82	96	40	23	53	44	28
29	52	36	30	35	53	84	32	99	87	8201	46	30	60	52	29
30	6055	6239	6433	5639	6856	7088	7336	7603	7892	8207	8552	8936	9368	9861	30
31	58	42	37	42	60	92	41	08	97	12	58	43	76	70	31
32	61	45	40	46	64	96	45	12	7902	18	65	50	83	79	32
33	64	49	43	49	68	7100	49	17	07	23	71	57	91	88	33
34	67	52	47	53	71	04	53	22	12	29	77	63	99	97	34
35	70	55	50	56	75	08	58	26	17	34	83	70	9407	9906	35
36	73	58	53	60	79	12	62	31	22	40	89	77	14	15	36
37	76	61	57	63	83	16	66	36	27	45	95	84	22	24	37
38	79	64	60	67	86	20	71	40	32	51	8601	91	30	33	38
39	82	68	63	70	90	24	75	45	37	56	07	98	38	42	39
40	6085	6271	6467	6674	6894	7128	7379	7650	7942	8262	8614	9005	9445	9951	40
41	88	74	70	77	98	32	84	54	48	67	20	12	53	59	41
42	91	77	73	81	6901	36	88	59	53	73	26	18	61	69	42
43	94	80	77	85	05	40	92	64	58	79	32	25	69	78	43
44	97	83	80	88	09	45	97	68	63	84	38	32	77	87	44
45	6100	87	83	92	13	49	7401	73	68	90	44	39	85	9996	45
46	03	90	87	95	17	53	06	78	73	95	51	46	93	10005	46
47	06	93	90	99	20	57	10	83	78	8301	57	53	9501	10015	47
48	09	96	94	6702	24	61	14	87	83	07	63	60	05	10024	48
49	12	99	97	06	28	65	19	92	89	12	69	67	17	10033	49
50	6115	6303	6500	6710	6932	7169	7423	7697	7994	8318	8676	9074	9525	10043	50
51	18	06	04	13	36	73	27	7702	59	24	82	81	33	10052	51
52	21	09	07	17	40	77	32	06	8004	29	88	88	41	10061	52
53	24	12	11	20	43	81	36	11	09	35	95	96	49	10071	53
54	27	15	14	24	47	85	41	16	14	41	8701	9103	57	10080	54
55	30	19	17	28	51	89	45	21	20	47	07	10	65	10089	55
56	33	22	21	31	55	93	49	25	25	52	14	17	73	10099	56
57	36	25	24	35	59	98	54	30	30	58	20	24	81	10108	57
58	40	28	28	38	63	7202	58	35	35	64	26	31	89	10118	58
59	43	32	31	42	66	06	63	40	40	69	33	38	98	10127	59

M	84 d	85 d	86 d	87 d	88 d	89 d	M
0	10137	10765	11533	12522	13916	16300	0
1	147	776	547	541	945	357	1
2	157	788	561	561	974	416	8
3	166	799	576	580	14003	476	3
4	175	811	590	599	033	537	4
5	185	822	605	619	063	599	5
6	195	834	620	639	093	662	6
7	205	846	634	659	123	726	7
8	214	858	649	679	154	792	8
9	224	869	664	699	184	858	9
10	10234	10881	11679	12719	14216	16926	10
11	244	893	694	739	247	996	11
12	254	905	709	759	279	17067	18
13	264	917	724	780	311	139	13
14	273	929	739	801	343	213	14
15	283	941	755	821	376	289	15
16	293	953	770	842	408	366	16
17	303	965	785	863	442	445	17
18	314	978	801	884	475	526	18
19	324	990	816	906	509	609	19
20	10334	11002	11832	12927	14543	17693	20
21	344	014	848	949	578	781	21
22	354	027	863	970	613	870	22
23	364	039	879	992	648	962	23
24	374	052	895	13014	684	18056	24
25	385	064	911	036	720	153	25
26	395	077	927	059	756	252	26
23	405	089	943	081	793	355	27
28	416	102	959	104	830	461	28
29	426	115	976	126	868	570	29
30	10437	11127	11992	13149	14906	18682	30
31	447	140	12008	172	943	799	31
32	457	153	025	195	983	920	32
33	468	166	041	219	15022	19045	33
34	478	179	058	242	062	174	34
35	489	192	075	266	102	309	35
36	500	205	092	290	143	450	36
37	510	218	109	314	184	596	37
38	521	231	126	338	226	749	38
39	532	244	143	362	268	909	39
40	10542	11257	12160	13386	15311	20076	40
41	553	270	177	411	354	253	41
42	564	284	194	437	398	439	42
43	575	297	212	461	442	635	43
44	586	310	229	486	487	843	44
45	597	324	247	511	532	21065	45
46	608	337	264	537	579	303	46
47	619	351	282	563	625	557	47
48	630	365	300	589	673	832	48
49	641	378	318	615	721	22132	49
50	10652	11392	12336	13641	15770	22459	50
51	663	406	354	668	819	22821	51
52	674	420	373	695	869	23226	52
53	685	434	391	721	920	23685	53
54	696	448	409	749	972	24215	54
55	708	462	428	776	16024	24842	55
56	719	476	447	804	078	25609	56
57	730	490	465	832	132	26598	57
58	742	504	484	860	187	27992	58
59	753	518	503	888	243	30375	59

The Uſe of the Table *of* Meridional Parts.

IN this Table the firſt and laſt Column of every Page mark'd M, beginning at 0, and ending at 59, contain the Minutes anſwering to every Degree of Latitude, the other Columns mark'd 1d, 2d, *&c.* contain the Meridional Parts, anſwering to the Degree of Latitude they ſtand under.

So that if you would find the Meridional Parts anſwering to any Latitude, ſuppoſe for Example, the Latitude 51.32, look in the Colume under 51d. and right againſt 32 (in the Column for Minutes) you will find 20, to which prefix 36, the two Figures in the ſame Column that ſtand above 20 towards the Left-Hand, and it makes 3620, the Meridional Parts required.

Two Latitudes being given, to find the Meridional Difference of Latitude.

Caſe 1ſt, If both Latitudes be North or both South, ſubtract the Meridional Parts of the Leſſer, from the Meridional Parts of the Greater, the Remainder will be the Meridional Difference of Latitude.

Caſe 2d, If one Latitude be North and the other South, then add their Meridional Parts together, and the Sum will be the Meridional Difference of Latitude.

A TABLE of Amplitudes, from the Latitude 00 deg. 00 min. to the Latitude 12 deg. either North or South.

Degrees of Declination.	The Degrees of Latitude.											
	1	2	3	4	5	6	7	8	9	10	11	12
	D M	D M	D M	D M	D M	D M	D M	D M	D M	D M	D M	D M
0	00 00	00 00	00 00	00 00	00 00	00 00	00 00	00 00	00 00	00 00	00 00	00 00
1	01 00	01 00	01 00	01 00	01 00	01 00	01 00	01 00	01 00	01 01	01 01	01 01
2	02 00	02 00	02 00	02 00	02 00	02 00	02 01	02 01	02 01	02 02	02 02	02 03
3	03 00	03 00	03 00	03 00	03 00	03 01	03 01	03 01	03 02	03 03	03 03	03 04
4	04 00	04 00	04 00	04 00	04 01	04 01	04 02	04 02	04 03	04 04	04 04	04 05
5	05 00	05 00	05 00	05 01	05 01	05 01	05 02	05 03	05 03	05 05	05 05	05 07
6	06 00	06 00	06 00	06 01	06 01	06 02	06 02	06 03	06 04	06 06	06 07	06 08
7	07 00	07 00	07 01	07 01	07 02	07 02	07 03	07 04	07 05	07 07	07 07	07 09
8	08 00	08 00	08 01	08 01	08 02	08 02	08 03	08 04	08 06	08 08	08 09	08 11
9	09 00	09 00	09 01	09 01	09 02	09 03	09 04	09 05	09 07	09 09	09 10	09 12
10	10 00	10 00	10 01	10 01	10 02	10 03	10 04	10 05	10 07	10 10	10 11	10 13
11	11 00	11 00	11 01	11 01	11 03	11 03	11 05	11 06	11 08	11 11	11 12	11 15
12	12 00	12 00	12 01	12 01	12 03	12 04	12 05	12 07	12 09	12 12	12 13	12 16
13	13 00	13 00	13 01	13 02	13 03	13 04	13 06	13 08	13 10	13 13	13 15	13 18
14	14 00	14 00	14 01	14 02	14 03	14 04	14 06	14 08	14 10	14 14	14 16	14 19
15	15 00	15 00	15 01	15 02	15 04	15 05	15 07	15 09	15 11	15 15	15 17	15 21
16	16 00	16 01	16 01	16 02	16 04	16 05	16 07	16 09	16 12	16 16	16 18	16 22
17	17 00	17 01	17 01	17 02	17 04	17 05	17 08	17 10	17 13	17 17	17 20	17 23
18	18 00	18 01	18 01	18 02	18 04	18 06	18 08	18 11	18 14	18 18	18 21	18 25
19	19 00	19 01	19 01	19 03	19 04	19 06	19 09	19 11	19 15	19 19	19 22	19 26
20	20 00	20 01	20 02	20 03	20 05	20 07	20 09	20 12	20 16	20 20	20 24	20 28
21	21 00	21 01	21 07	21 03	21 05	21 07	21 10	21 13	21 17	21 21	21 25	21 29
22	22 00	22 01	22 02	22 03	22 05	22 07	22 10	22 13	22 17	22 22	22 26	22 31
23	23 00	23 01	23 02	23 03	23 05	23 08	23 11	23 14	23 18	23 23	23 28	23 33
23,29	23 29	23 30	23 31	23 33	23 35	23 38	23 40	23 44	23 49	23 54	23 57	24 02

A TABLE of Amplitudes, from the Latitude 13 deg. 00 min. to the Latitude 24 deg. either North or South.

Degrees of Declination.	The Degrees of Latitude.																							
	13		14		15		16		17		18		19		20		21		22		23		24	
	D	M	D	M	D	M	D	M	D	M	D	M	D	M	D	M	D	M	D	M	D	M	D	M
0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
1	01	02	01	02	01	02	01	02	01	02	01	03	01	03	01	04	01	04	01	04	01	05	01	05
2	02	03	02	03	02	04	02	05	02	05	02	06	02	07	02	08	02	08	02	09	02	10	02	11
3	03	05	03	05	03	06	03	07	03	08	03	09	03	10	03	12	03	13	03	14	03	15	03	17
4	04	06	04	07	04	08	04	10	04	11	04	12	04	13	04	15	04	17	04	19	04	21	04	23
5	05	08	05	09	05	11	05	12	05	13	05	15	05	17	05	19	05	21	05	23	05	26	05	28
6	06	10	06	11	06	13	06	15	06	16	06	19	06	21	06	23	06	26	06	28	06	31	06	34
7	07	11	07	13	07	15	07	17	07	19	07	22	07	24	07	27	07	30	07	33	07	36	07	40
8	08	12	08	15	08	17	08	19	08	22	08	25	08	28	08	31	08	34	08	38	08	42	08	45
9	09	14	09	17	09	19	09	22	09	25	09	28	09	31	09	35	09	39	09	43	09	47	09	51
10	10	15	10	18	10	21	10	24	10	27	10	30	10	34	10	38	10	43	10	47	10	52	10	57
11	11	17	11	20	11	23	11	27	11	30	11	34	11	38	11	43	11	48	11	52	11	58	12	03
12	12	19	12	22	12	25	12	29	12	33	12	38	12	42	12	47	12	52	12	57	13	03	13	10
13	13	21	13	24	13	28	13	32	13	36	13	41	13	47	13	52	13	58	14	04	14	10	14	17
14	14	22	14	26	14	30	14	34	14	39	14	44	14	50	14	55	15	01	15	07	15	14	15	21
15	15	24	15	28	15	32	15	37	15	42	15	47	15	53	16	00	16	05	16	12	16	19	16	27
16	16	26	16	30	16	35	16	40	16	45	16	51	16	57	17	03	17	10	17	18	17	25	17	34
17	17	28	17	32	17	37	17	42	17	48	17	54	18	01	18	07	18	15	18	23	18	31	18	40
18	18	30	18	34	18	40	18	45	18	51	18	57	19	05	19	11	19	20	19	28	19	37	19	46
19	19	31	19	36	19	42	19	48	19	54	20	01	20	08	20	16	20	24	20	33	20	43	20	52
20	20	33	20	38	20	44	20	51	20	57	21	05	21	12	21	20	21	29	21	39	21	49	21	59
21	21	35	21	41	21	46	21	53	22	00	22	08	22	16	22	25	22	34	22	44	22	35	23	00
22	22	37	22	43	22	49	22	56	23	04	23	12	23	20	23	29	23	39	23	50	24	01	24	12
23	23	38	23	45	23	51	23	59	24	07	24	15	24	24	24	34	24	44	24	55	25	07	25	19
23,2	24	08	24	15	24	22	24	29	24	38	24	46	24	56	25	05	25	16	25	27	25	39	25	51

A TABLE of Amplitudes, from the Latitude 25 deg. 00 min. to the Latitude 36 deg either North or South.

Degrees of Declination.	The Degrees of Latitude.																					
	25		26		27		28		29		30		31		32		33		34		35		36	
	D	M	D	M	D	M	D	M	D	M	D	M	D	M	D	M	D	M	D	M	D	M	D	M
0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
1	01	06	01	07	01	07	01	08	01	08	01	09	01	10	01	10	01	11	01	12	01	13	01	14
2	02	12	02	13	02	14	02	16	02	17	02	18	02	20	02	21	02	23	02	25	02	27	02	28
3	03	18	03	20	03	22	03	24	03	25	03	28	03	30	03	33	03	35	03	37	03	40	03	43
4	04	25	04	27	04	29	04	32	04	34	04	37	04	40	04	43	04	46	04	50	04	53	04	57
5	05	31	05	33	05	36	05	40	05	43	05	46	05	50	05	54	05	58	06	02	06	06	06	11
6	06	37	06	41	06	44	06	48	06	52	06	56	07	00	07	04	07	09	07	15	07	20	07	25
7	07	43	07	48	07	51	07	56	08	00	08	05	08	10	08	16	08	21	08	27	08	33	08	39
8	08	50	08	54	08	59	09	04	09	09	09	15	09	21	09	27	09	33	09	39	09	47	09	54
9	09	56	10	01	10	06	10	12	10	18	10	24	10	31	10	37	10	45	10	52	11	00	11	09
10	11	02	11	07	11	14	11	20	11	26	11	33	11	41	11	48	11	56	12	04	12	13	12	23
11	12	09	12	15	12	22	12	29	12	36	12	43	12	52	13	00	13	09	13	18	13	28	13	38
12	13	16	13	23	13	29	13	37	13	45	13	53	14	02	14	11	14	21	14	31	14	42	14	53
13	14	23	14	31	14	38	14	46	14	54	15	03	15	13	15	23	15	33	15	44	15	56	16	09
14	15	29	15	37	15	45	15	54	16	03	16	13	16	23	16	34	16	45	16	57	17	11	17	24
15	16	35	16	44	16	53	17	03	17	12	17	23	17	34	17	46	17	58	18	11	18	25	18	39
16	17	42	17	51	18	01	18	11	18	22	18	33	18	45	18	58	19	11	19	25	19	39	19	55
17	18	49	18	59	19	09	19	20	19	31	19	43	19	56	20	10	20	24	20	39	20	54	21	11
18	19	56	20	06	20	17	20	29	20	41	20	54	21	08	21	22	21	37	21	53	22	10	22	27
19	21	03	21	14	21	26	21	38	21	51	22	05	22	19	22	34	22	50	23	07	23	25	23	43
20	22	10	22	22	22	34	22	48	23	01	23	16	23	31	23	47	24	04	24	21	24	40	25	00
21	23	18	23	30	23	43	23	57	24	11	24	27	24	43	25	00	25	18	25	36	25	56	26	18
22	24	24	24	38	24	51	25	06	25	22	25	38	25	55	26	13	26	32	26	51	27	13	27	35
23	25	32	25	46	26	00	26	16	26	32	26	49	27	07	27	26	27	46	28	07	28	29	28	53
23,29	26	05	26	19	26	34	26	49	27	06	27	23	27	42	28	01	28	22	28	44	29	06	29	30

A TABLE of Amplitudes, from the Latitude 37 deg. 00 min. to the Latitude 48 deg. either North or South.

Degrees of Declination.	The Degrees of Latitude.																							
	37		38		39		40		41		42		43		44		45		46		47		48	
	D	M	D	M	D	M	D	M	D	M	D	M	D	M	D	M	D	M	D	M	D	M	D	M
0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
1	01	15	01	16	01	17	01	18	01	19	01	21	01	22	01	23	01	25	01	26	01	28	01	29
2	02	30	02	32	02	34	02	36	02	39	02	41	02	44	02	47	02	50	02	53	02	56	02	59
3	03	45	03	48	03	51	03	55	03	58	04	02	04	06	04	10	04	15	04	19	04	24	04	29
4	05	00	05	05	05	08	05	13	05	18	05	23	05	28	05	34	05	40	05	46	05	52	05	59
5	06	15	06	21	06	26	06	32	06	38	06	44	06	51	06	58	07	05	07	12	07	20	07	29
6	07	31	07	37	07	43	07	50	07	57	08	05	08	13	08	21	08	30	08	39	08	49	08	59
7	08	46	08	54	09	01	09	09	09	17	09	26	09	35	09	45	09	56	10	06	10	18	10	30
8	10	02	10	11	10	19	10	28	10	37	10	47	10	58	11	09	11	21	11	34	11	47	12	00
9	11	17	11	27	11	37	11	47	11	57	12	09	12	21	12	34	12	47	13	01	13	16	13	31
10	12	32	12	43	12	54	13	05	13	18	13	31	13	44	13	58	14	13	14	28	14	44	15	02
11	13	49	14	01	14	12	14	25	14	39	14	53	15	07	15	22	15	38	15	56	16	15	16	34
12	15	05	15	18	15	31	15	45	16	00	16	15	16	31	16	48	17	06	17	25	17	45	18	06
13	16	21	16	35	16	49	17	05	17	20	17	37	17	55	18	13	18	33	18	54	19	16	19	39
14	17	38	17	53	18	08	18	24	18	42	19	00	19	19	19	39	20	00	20	23	20	47	21	12
15	18	54	19	10	19	27	19	44	20	04	20	23	20	43	21	05	21	28	21	52	22	18	22	45
16	20	11	20	28	20	46	21	05	21	25	21	46	22	08	22	32	22	56	23	23	23	50	24	20
17	21	28	21	46	22	06	22	26	22	47	23	10	23	34	23	59	24	25	24	53	25	23	25	55
18	22	46	23	05	23	26	23	47	24	10	24	34	24	59	25	26	25	54	26	25	26	57	27	31
19	24	03	24	24	24	46	25	09	25	33	25	58	26	25	26	54	27	25	27	58	28	32	29	07
20	25	21	25	43	26	06	26	31	26	56	27	24	27	53	28	23	28	56	29	31	30	07	30	45
21	26	39	27	03	27	27	27	53	28	21	28	50	29	20	29	53	30	27	31	03	31	42	32	23
22	27	58	28	23	28	49	29	16	29	45	30	16	30	48	31	22	31	58	32	37	33	18	34	03
23	29	17	29	43	29	11	30	40	31	11	31	43	32	16	32	51	33	30	34	12	34	56	35	43
23,29	29	56	30	22	30	50	31	20	31	52	32	28	33	03	33	40	34	20	35	03	35	48	36	35

A TABLE of Amplitudes, from the Latitude 49 deg. 00 min. to the Latitude 60 deg either North or South.

Degrees of Declination.	The Degrees of Latitude.																							
	49		50		51		52		53		54		55		56		57		58		59		60	
	D	M	D	M	D	M	D	M	D	M	D	M	D	M	D	M	D	M	D	M	D	M	D	M
0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
1	01	31	01	33	01	35	01	37	01	39	01	42	01	45	01	47	01	50	01	53	01	56	02	00
2	03	03	03	06	03	10	03	15	03	20	03	24	03	29	03	34	03	40	03	46	03	53	04	00
3	04	34	04	40	04	46	04	52	04	59	05	06	05	14	05	22	05	31	05	40	05	50	06	00
4	06	06	06	14	06	22	06	30	06	39	06	49	06	59	07	10	07	22	07	34	07	47	08	01
5	07	38	07	48	07	58	08	08	08	19	08	31	08	44	08	57	09	11	09	26	09	43	10	02
6	09	10	09	21	09	33	09	46	10	00	10	15	10	30	10	47	11	04	11	22	11	42	12	04
7	10	42	10	55	11	09	11	24	11	40	11	57	12	15	12	35	12	56	13	18	13	41	14	06
8	12	14	12	29	12	45	13	02	13	21	13	41	14	02	14	24	14	48	15	14	15	41	16	10
9	13	47	14	05	14	24	14	43	15	04	15	26	15	49	16	14	16	45	17	10	17	41	18	14
10	15	21	15	40	16	01	16	23	16	46	17	11	17	37	18	05	18	33	19	07	19	41	20	18
11	16	54	17	16	17	39	18	03	18	29	18	57	19	26	19	56	20	29	21	04	21	43	22	26
12	18	28	18	52	19	18	19	44	20	12	20	43	21	15	21	49	22	25	23	04	23	47	24	34
13	20	03	20	29	20	57	21	26	21	57	22	30	23	05	23	43	24	23	25	07	25	54	26	44
14	21	38	22	06	22	37	23	08	23	42	24	18	24	56	25	37	26	21	27	09	28	01	28	55
15	23	14	23	45	24	18	24	52	25	28	26	07	26	49	27	34	28	22	29	14	30	12	31	09
16	24	51	25	24	25	59	26	36	27	16	27	58	28	43	29	32	30	24	31	21	32	22	33	27
17	26	28	27	03	27	41	28	21	29	04	29	50	30	39	31	31	32	27	33	28	34	32	35	47
18	28	06	28	43	29	24	30	07	30	53	31	42	32	35	33	33	34	34	35	40	36	53	38	09
19	29	45	30	25	31	08	31	55	32	45	33	38	34	35	35	36	36	46	37	54	39	13	40	36
20	31	25	32	08	32	54	33	44	34	39	35	35	36	36	37	42	38	53	40	12	41	37	43	10
21	33	06	33	52	34	41	35	34	36	31	37	32	38	39	39	51	41	09	42	34	44	05	45	48
22	34	48	35	37	36	30	37	27	38	29	39	26	40	47	42	04	43	27	44	59	46	40	48	30
23	36	33	37	26	38	23	39	24	40	29	41	40	42	56	44	19	45	50	47	39	49	21	51	24
23,29	37	26	38	20	39	19	40	23	41	29	42	46	44	00	45	27	47	02	48	46	50	47	52	51

A TABLE of Amplitudes from the Latitude 61 Deg. 00 min. to the Latitude 66 deg. either North or South.

Degrees of Declination.	The Degrees of Latitude.											
	61		62		63		64		65		66	
	D	M	D	M	D	M	D	M	D	M	D	M
0	00	00	00	00	00	00	00	00	00	00	00	00
1	02	03	02	07	02	12	02	17	02	22	02	27
2	04	08	04	15	04	24	04	33	04	44	04	55
3	06	12	06	24	06	37	06	51	07	06	07	23
4	08	17	08	32	08	50	09	09	09	30	09	52
5	10	21	10	41	11	04	11	28	11	54	12	22
6	12	27	12	52	13	19	13	47	14	19	14	53
7	14	34	15	02	15	34	16	08	16	45	17	26
8	16	40	17	14	17	51	18	30	19	13	20	00
9	18	49	19	28	20	09	20	54	21	43	22	37
10	20	57	21	40	22	27	23	18	24	13	25	14
11	23	10	23	58	24	51	25	48	26	50	27	58
12	25	23	26	17	27	15	28	19	29	28	30	44
13	27	39	28	37	29	42	30	52	32	09	33	34
14	29	56	31	01	32	12	33	30	34	55	36	29
15	32	16	33	27	34	45	36	11	37	46	39	31
16	34	39	35	57	37	23	38	57	40	42	42	40
17	37	05	38	31	40	05	41	49	43	46	45	58
18	39	36	41	10	42	54	44	49	46	59	49	26
19	42	11	43	54	45	49	47	57	50	23	53	11
20	44	52	46	46	48	53	51	17	54	02	57	14
21	47	40	49	46	52	07	54	50	57	59	61	47
22	50	35	52	56	55	36	58	43	62	26	67	04
23	53	42	56	20	59	24	63	02	67	36	73	52
23,29	55	17	58	04	61	22	65	22	70	33	78	25

The Use of the TABLES of Amplitudes.

The Amplitude of the Sun or any Star, is so many Degrees Distance as they Rise or Set, from the East or West Points of the Horizon, either Northerly or Southerly.

Note, When the Sun or Stars have North Declination then the Amplitude found by these Tables must be reckoned from the East toward the North at their Rising; or from the West towards the North at their Setting.

But if they have South Declination, then the Amplitude must be reckoned from the East toward the South at their Rising; or from the West toward the South at their Setting.

To find the true Amplitude by the Tables.

Look for the given Latitude at the Top of the Table, and the Declination in the first Column to the Left-Hand, and in the Common Angle of meeting, you will find the Amplitude required, in Degrees and Minutes.

Caſe 1ſt. WHen the Latitude and Declination are both given in even Degrees, as for *Example.* Suppoſe I would know the Sun's true Amplitude at his Riſing, in the Latitude of 40 00, his Declination being 17 00 N.

Under Latitude 40, and right againſt Declination 17 I find 22 26, which is the Sun's true Amplitude, to be counted from the Eaſt towards the North (becauſe it is at Riſing, and the Declination is North) that is E. 22 26 N.

Caſe 2d. When the Latitude is given in even Degrees, and the Declination in Degrees and Minutes, as for *Example.* Suppoſe I would know the Sun's true Amplitude at his Setting, in the Latitude of 57 00, his Declination being 11 33 S.

Find his Amplitude as before, for the Latitude 57, and for the Declination { 11 deg. / 12 deg. } which will be { 20 29 / 22 25 } then ſubtract the Leſſer from the Greater, the Diff. is 1 56 or 116 m. to which put two Cyphers, and it makes 11600, which Number muſt be divided by the Number ſtanding againſt the odd Minutes of Declination (in the following Table) which in this *Caſe* is 181, and the Quotient gives the Proportional Parts in Minutes, which Parts are always to be added to the Leſſer of the two Amplitudes that you took the Difference of, and the Sum gives the true Amplitude as follows,

181)11600(64 Proportional Parts in Minutes,
740 makes 1 Degree 4 Minutes.
10

Leſſer of the Amplitudes	20 29
Proportional Parts to be added	01 04
True Amplitude	W. 21 33 S.

becauſe at Sun-ſetting, and the Declination South.

Caſe 3d. When the Declination is given in even Degrees and the Latitude in Degrees and Minutes, as for *Example.* Suppoſe I would know the Sun's true Amplitude at his Riſing, in the Latitude 51 14 his Declination being 14 00 S.

Find his Amplitude as before, to 14 Degrees Declination, and for the Latitude { 51 deg. / 52 deg. } which will be { 22 37 / 23 08 } and ſubtract *the Leſſer from* the greater, the Difference is 0 31 Minutes.

To

To the Difference of Amplitudes found on the foregoing Side, which is 31, put two Cyphers and makes it 3100, which muſt be divided by the Number ſtanding againſt the odd Minutes of Latitude (in the following Table) which in this *Caſe* is 428, and the Quotient gives the Proportional Parts in Minutes, to be added to the Leſſer of the two Amplitudes, as in *Caſe* the 2*d*.

428)3100(7 Proportional Parts in Minutes.
104

Leſſer of the Amplitudes —— 22 37
Proportional Parts to be added —— 00 07
True Amplitude —— E. 22 44 S.

Caſe 4th. When the Latitude and Declination are both given in Degrees and Minutes, as for *Example*. Suppoſe I would know the Sun's true Amplitude at his ſetting, in the Latitude 49 18, his Declination being 19 41 N.

Firſt, find his Amplitude for Latitude 49 Degrees, and Declination 19 41 (as in *Caſe the* 2*d*) which will be 30 53.

In the ſame manner find his Amplitude for Latitude 50 Degrees, and Declination 19 41, which will be 31 35.

Then from the Greater Amplitude —— 31 35
Subtract the Leſſer —— 30 53
Remains the Difference —— 00 42 Minutes.

Put two Cyphers to this Difference it makes 4200, which muſt be divided by the Numbers ſtanding right againſt the odd Minutes of the given Latitude, (in the following Table) which in this *Caſe* is 333, the Quotient gives the Proportional Parts in Minutes, to be added to the Leſſer of the two Amplitudes, *&c.*

333)4200(12 Proportional Parts.
870
204

The Leſſer Amplitude —— 30 53
Proportional Parts to be added —— 00 12
True Amp. for Lat. 49 18, and Decl. 19 41 N. W. 31 05 N.

A TABLE of Numbers, for finding the Proportional Parts, to the odd Minutes of Latitude or Declination, in finding the Sun's true Amplitude.

Odd Minutes.	Numbers.	Odd Minutes.	Numbers.	Odd Minutes.	Numbers.	Odd Minutes.	Numbers.
1	6000	16	375	31	193	46	130
2	3000	17	353	32	187	47	127
3	2000	18	333	33	181	48	125
4	1500	19	316	34	176	49	122
5	1200	20	300	35	171	50	120
6	1000	21	285	36	166	51	118
7	857	22	273	37	162	52	115
8	750	23	261	38	158	53	113
9	666	24	250	39	154	54	111
10	600	25	240	40	150	55	109
11	545	26	230	41	146	56	107
12	500	27	222	42	143	57	105
13	461	28	214	43	139	58	103
14	428	29	207	44	136	59	101
15	400	30	200	45	133		

The Uſe of this Table is to find a Number to divide the Difference of Amplitudes by, in order to find the Proportional Parts, when the Amplitude is required for any Latitude or Declination that is given in Degrees and Minutes, (as in the foregoing *Caſes*) to find which Number, look in ſome of the Columns under the Title of odd Minutes, for your given Minutes of Latitude or Declination, as Suppoſe for 37 Minutes, and right againſt that you will find 162, which is the Number required.

To

To find the Variation of the Compaſs *by an Amplitude.*

To do this, you muſt have given both the true and magnetical Amplitudes.

The true Amplitude is to be found by the Tables as before taught.

The magnetical Amplitude is to be found by the Compaſs, at the Time of the Sun's-riſing or ſetting, and is ſo many Degrees and Minutes as you find it to riſe from the Eaſt, or to ſet from the Weſt, either to the Northward or to the Southward; As for *Examp.* Suppoſe being at Sea, I find by ſetting the Sun with my Compaſs, that he riſes 10 deg. 15 min. to the Northward of the Eaſt, then the magnetical Amplitude is E. 10 15 N. Or Suppoſe I find by the Compaſs, then he ſets 14 deg. 12 min. to the Southward of the Weſt, then the magnetical Amplitude is W. 14 12 S.

Then if your true Amplitude and magnetical Amplitude are both to the Northward, or both to the Southward, ſubtract the Leſſer from the Greater, the Remainder is the Variation.

But if one be to the Northward, and the other to the Southward, add them together, and the Sum will be the Variation.

		d.	m.	
Example 1ſt.	True Amplitude —— ——	E. 18	34	N.
	Magnetical Amplitude ——	E. 22	37	N.
	Variation —— —— ——	04	03	Eaſterly.

Example 2d.	True Amplitude —— ——	W. 7	11	S.
	Magnetical Amplitude ——	W. 2	06	N.
	Variation —— —— ——	9	17	Weſterly.

And thus having found how much the Variation is, it remains in the next Place to find which way it is, that is, whether it is Eaſterly or Weſterly.

Rule, If the Amplitude be taken at Sun-riſing, and the magnetical Amplitude be farther from the North than the true Amplitude is, then the Variation is Weſterly, but if it be nearer to the North, it is Eaſterly.

If it be taken at Sun-ſetting, if the magnetical Amplitude be farther from the North than the true Amplitude is, then the Variation is Eaſterly, but if it be nearer to the North it is Weſterly, as may be ſeen by the two foregoing Examples. By

By keeping a Journal is meant, keeping ſuch an Account of the Ship's Way, that at any Time you may be able to know what Latitude and Longitude the Ship is in.

When a Ship is bound from any one Place to another that lies ſo far from it, that ſhe is obliged to go out of ſight of the Land for any conſiderable Time, as ſuppoſe from *England* to *Barbadoes*, then at the Time ſhe leaves the Land, ſhe is ſaid to take her Departure, and that part of the Land, ſhe then leaves, as ſuppoſe the *Start*, the *Lizard*, the *Land's-end*, &c. is ſaid to be the Place they take their Departure from. And at the Time of taking ſuch Departure, the Captain or Mate generally takes the Bearing and Diſtance of that Land (according to his Judgment) and ſets it down on the Log-Board, or in the Log-Book againſt the Time it was taken, thus,

Lizard, N. by W. Diſtance 5 Leagues.
Or, *Start*, N. N. E. Diſtance 6 Leagues, *&c.*

And in the ſame manner for any other Place, Bearing and Diſtance, as you will ſee in the firſt Day's Log, of the following Journal.

The Log-book being mark'd as follows, with Columns for Courſe, Diſtance, Northing or Southing, Eaſting or Weſting, Latitude by Dead Reckoning, Latitude by Obſervation, Meridian Diſtance, Longitude made, and Longitude in, you are to take Notice,

That in the Column for Courſe, you are always to ſet down the Courſe you have made by your Reckoning for that 24 Hours (that is from the Noon of the Day before, to the Noon of the Day you Work on) the Sea Account being always kept from Noon to Noon.

In the Column for Diſtance, you are to ſet down the Diſtance made by your Reckoning for that 24 Hours.

In the Column of Northing or Southing, you are to ſet down the Difference of Latitude made that 24 Hours, marking the Column with N. if the Difference of Latitude be Northerly, or with S. if it be Southerly.

In the Column of Eaſting or Weſting, you are to ſet down the Departure made that 24 Hours, marking the Column with E. if the Departure be Eaſterly, or with W. if it be Weſterly.

In the Column mark'd Lat. by D. R. you are to ſet down the Latitude you reckon your ſelf in on that Day. In

In the Column mark'd Lat. by Obſ. you are to ſet down the Latitude you find yourſelf to be in by Obſervation, if you have one, if not, then let it ſtand open.

In the Column for Mer. Diſt. you are to ſet down (in Degrees and Minutes) how much Departure you have made in all, from the Place you took your Departure from.

In the Column of Long. made, you are to ſet down (in Degrees and Minutes) how much Difference of Longitude you have made in all from the Place you took your Departure from.

In the Column of Long. in, you are to ſet down what Longitude you find yourſelf to be in on that Day by your Reckoning.

Note, The Account of Longitude made, being what is always kept in his Majeſty's *Navy*. And the Account of Longitude in, being moſt generally kept on Board the Merchant Ships: I ſhall in this Treatiſe ſhew how to keep them both, and ſhall leave it to the Practitioner's choice which he will make uſe of, they both being equally true, and there being no occaſion to keep more than one of them.

And now having (I think) given a ſufficient Account of the Things that are to be ſet down in the ſeveral Columns, I ſhall lay down theſe few neceſſary Rules following, and then proceed to ſhew how they are all to be found, or the Method of Working a Day's Work at Sea.

Rule 1ſt, Variation, if there be any, (as moſt commonly there is,) muſt be allowed upon all Courſes ſteered, and upon all Bearings, *&c.* that are taken by the Compaſs, that is, if it be Eaſterly Variation it muſt be allowed to the Right-hand: But if Weſterly Variation, then to the Left-hand of the Courſe or Bearing: Suppoſing your ſelf placed in the Center of the Compaſs, and looking directly forward to the Point you are to allow the Variation from.

Example. Suppoſe I ſteer SW. and there is one Point Weſterly Variation, then my true Courſe will be SW. by S. or ſuppoſe I ſet a Point of Land, and find it to bear by my Compaſs ESE. and I know there is half a Point Eaſterly Variation, then the true Bearing is SE. by E. $\frac{1}{2}$ E.

Rule 2d, Lee-way (which I ſhall not here deſcribe, becauſe ſufficiently known to every Seaman) muſt be allow'd to the Right-hand of the Courſe ſteer'd, when the Larboard Tacks are Aboard, and to the Left-hand when the Starboard Tacks are Aboard. *Ex.*

Example. Suppoſe I ſteer NE. by E. with my Larboard Tacks Aboard, and make one Point Lee-way, then my Courſe made good is ENE.

Rule 3d. Lee-way and Variation, when they are both to be allow'd one way, that is, both to the Right-hand, or both to the Left, add them together, and allow their Sum the ſame way they were to be allow'd.

But if they are to be allow'd one to the Right-hand, and the other to the Left, ſubtract the Leſſer from the Greater, and allow the Remainder the ſame way as the Greater of them was to be allow'd.

Example Suppoſe I ſteer NNW. with my Starboard Tacks Aboard, and make one Point Lee-way, there being at the ſame Time half a Point Weſterly Variation, I would know my true Courſe?

Lee-way to the Left-Hand —— —— 1 Point.
Variation to the Left-Hand —— —— 0 ½ Point.

Their Sum to be allowed to the Left-Hand 1 ¼ Points makes the true Courſe NW. by N. ½ W.

Example 2d. Suppoſe I ſteer SW. by W. with my Larboard Tacks Aboard, and make 2 ½ Points Lee-way, and I have 1 ¼ Points Weſterly Variation, what is my true Courſe?

Lee-way to the Right-Hand —— 2 ½ Points
Variation to the Left-Hand —— 1 ¼

The Remainder to be allow'd to the Right-hand 1 ¼ Points, makes the true Courſe WSW. ¼ W.

Rule 4th. When a Ship is lying too under a Main-ſail, Mizen, *&c.* then obſerve how ſhe comes up and falls of, and takes the middle between the two Points, and from that allow the Lee-way and Variation, as in *Rule 3d.*

Example. Suppoſe a Ship lying too under a Main-ſail, with the Starboard Tack Aboard, comes up E. by S. and falls off to NE. by E. there being 1 Point Weſterly Variation, and ſhe making 5 Points Lee-way, what Courſe does ſhe make good?

The middle between E. by S. and NE. by E. is E. by N. from which allowing 6 Points to the Left-Hand, (by *Rule 3d)* the true Courſe will be N. by E.

Rule 5th. Currents, the way they ſet you, and the Diſtance you ſuppoſe you are driven by them, is to be ſet in the Traverſe Table for the Day, as any other Courſe and Diſtance, *Ex.*

Example, Suppoſe I try the Current and find it to ſet W. by N. *per* Compaſs 1 Mile *per* Hour, the Variation being one Point Eaſterly, then if I ſail in that Current 24 Hours, I ſet down in the Traverſe Table, as a Courſe WNW. diſtant 24 Miles.

Rule 6th, Heave of the Sea, is to be accounted for in the ſame manner as Currents: As ſuppoſe, there is a great Sea heaving toward the S.W. by my Compaſs, there being $\frac{1}{2}$ Point Weſterly Variation, I then ſet down in my Traverſe-Table SW. by S. $\frac{1}{2}$ W. with ſo much Diſtance as I judge the Sea has heav'd the Ship.

Rule 7th, At leaving the Land, the oppoſite Point to the Bearing (with the Variation allow'd upon it) and the Diſtance you judge yourſelf from it, muſt be ſet down in the Traverſe-Table, as a Courſe and Diſtance.

Example, Suppoſe having 1 $\frac{1}{4}$ Weſterly Variation, the *Start* bears by my Compaſs NNE. diſtance 4 Leagues: The oppoſite Point to NNE. is SSW. which with the Variation makes S. $\frac{1}{4}$ W. for the Courſe to be ſet in the Traverſe-Table, diſtance 12 Miles.

Rule 8th, When you make the Land, the Bearing itſelf (with the Variation allow'd upon it) and the diſtance you judge yourſelf from it are to be ſet in the Traverſe-Table, as a Courſe and Diſtance: This needs no Example.

Note, If you keep only the Account of Longitude made, and would at any Time know what Longitude you are in, look out the Longitude of the Place you took your Departure from, and with that Longitude, and the Longitude made, taken as Difference of Longitude, find the Longitude in, by the Rules in Page 107 and 108. And the Longitude ſo found muſt be counted from the ſame Meridian that the Tables you look'd out the Longitude of the Place departed from, counts it.

RULES to Correct the Dead-Reckoning *by an* Obſervation.

WHEN you have made all the proper Allowances you can, ſuch as for Variation, Lee-way, Currents, *&c.* and ſtill find that your Latitude by Dead-Reckoning will not agree with the Latitude by Obſervation, within five Minutes, then you muſt Correct as follows:

CASE the Firſt.

If your Courſe found by Dead-Reckoning be due North, or due South.

Rule, Firſt find the Difference of Latitude (in Miles) between the laſt Obſervation, and the Obſervation on the Day you Correct, which will be the true Difference of Latitude, then will your true Courſe be the ſame as the Courſe by Dead-Reckoning. Your true Diſtance the ſame as the true Difference of Latitude. Your Departure oo, and your Meridian Diſtance, Longitude made, (or Longitude in) will be the ſame as they were on the Day you had the laſt Obſervation.

CASE the Second.

If the Courſe found by Dead-Reckoning be leſs than 3 Points, or 33 Degrees.

Rule, Firſt find the Difference of Latitude (in Miles) between the laſt Obſervation, and the Obſervation on the Day you Correct, which will be the true Difference of Latitude. Then make your true Courſe the ſame as the Courſe found by Dead-Reckoning, ſince the laſt Obſervation, and with that Courſe, and the true Difference of Latitude, find the true Diſtance and Departure (*as in Plain Sailing, Caſe the 2d,*) then to find the Meridian Diſtance, the Longitude made, and the Longitude in, take the following Rule.

N.B. The Difference of Longitude is to be found by the true Courſe, and the Meridional Difference of Latitude between the two Obſervations (as uſual) and the Meridian Diſtance, Longitude made (or Longitude in) are to be found by adding, or ſubtracting the true *Departure* and Difference of Longitude to, or from the Meridian *Diſtance, Longitude* made (or Longitude in) on the Day you had the *laſt Obſervation*, which is the Day you always Correct from. Caſe

CASE the Third.

If the Courſe found by Dead-Reckoning be more than 3 Points, or 33 Degrees, and leſs than 6 Points, or 67 Degrees.

Rule, Firſt find the Difference of Latitude in Miles between the laſt Obſervation, and the Obſervation on the Day you Correct, which will be the true Difference of Latitude: Then with the Courſe found by Dead-Reckoning, ſince the laſt Obſervation, and the true Difference of Latitude, find a new Departure (*by the ſecond Caſe of Plain Sailing*) add this new Departure to the Departure found by Dead-Reckoning ſince the laſt Obſervation, and take half their Sum for your true Departure: Then you have given the true Difference of Latitude and Departure to find your true Courſe and Diſtance, (*by Plain Sailing, Caſe 6th*) read here *N.B.* in Caſe the 2*d*.

CASE the Fourth.

If the Courſe found by Dead-Reckoning be more than 6 Points, or 67 Degrees.

Rule, Firſt find the Difference of Latitude in Miles, between the laſt Obſervation and the Obſervation on the Day you Correct, which will be the true Difference of Latitude, and make your true Departure the ſame, as the Departure found by Dead-Reckoning ſince the laſt Obſervation: Then you have given the true Difference of Latitude and Departure, to find the true Courſe and Diſtance (*by Plain Sailing, Caſe* 2*d.*) read here the *N.B.* in Caſe the 2*d*.

Note, As the Knowledge of which Caſe you are to Correct by, depends upon knowing your Courſe by Dead-Reckoning, and as when you Correct only for one Day, that Courſe is always found by the Difference of Latitude and Departure in your Traverſe-Table for that Day; therefore if you are to Correct for a longer Time than one Day, you muſt take the Northing, Southing, Eaſting and Weſting that you have made for every Day ſince the laſt Obſervation, (or if it be your firſt Obſervation, then for every Day from your leaving the Land) minding not to leave out the Difference of Latitude and Departure for the Day you are Correcting on, and bring them into a Traverſe-Table; by which you will find the whole Difference of Latitude and Departure, made by Dead-Reckoning ſince the laſt Obſervation, and with that ſame Difference of Latitude and Departure, find

find the Courſe made by Dead-Reckoning, then obſerve which of the foregoing Caſes that Courſe comes under, and Correct by the Rules for that Caſe, finding every Thing except the Diſtance.

And when you have ſo corrected, you are to ſet down in your Book only the Latitude by Dead-Reckoning, the Latitude by Obſervation, the Meridian Diſtance and the Long. made (or Longitude in) and rub out the Courſe, Difference of Latitude and Departure.

Then you have given the Latitude by Obſervation on the Day you Correct, and the Latitude by Dead-Reckoning on the Day before it, to find the Difference of Latitude for the laſt 24 Hours, (by the Rules for Latitude, Page 105.) Alſo the Meridian Diſtance on the Day you Correct, and the Meridian Diſtance on the Day before it, to find your Departure, (by ſubtracting the Leſſer from the Greater, if they are both Eaſt, or both Weſt; or by adding them together, if one be Eaſt and the other Weſt.) And with that Difference of Latitude and Departure find your Courſe and Diſtance, *(by the 6th Caſe of Plain Sailing)* which Courſe, Diſtance, Difference of Latitude and Departure are to be ſet down inſtead of them you rubb'd out.

Rules to find the Meridian Diſtance.

Caſe 1ſt, If the Meridian Diſtance on the Day you Work from be Eaſt, and you have ſail'd to the Eaſtward; or if it be Weſt, and you have ſail'd to the Weſtward, then add the Departure to the Meridian Diſtance, and the Sum will be the Meridian Diſtance you have made, of the ſame Name with that you work'd from.

Example Meridian Diſtance — — — 4 18 W.
Departure Weſterly 97 Miles, or — 1 37
Meridian Diſtance made in all — 5 55 W.

Caſe 2d, If your Meridian Diſtance be Eaſt, and the Departure be Weſterly; or if the Meridian Diſtance be Weſt, and Departure Eaſterly, then ſubtract the Leſſer from the Greater, the Remainder will be the Meridian Diſtance you have made, of the ſame Name with the Greater of the two.

Example 1ſt. Meridian Diſtance— — — 7 34 W.
Departure Eaſterly — — 1 16
Meridian Diſtance made in all 6 18 W.

Example 2d. Meridian Diſtance— — — 1 34 W.
Departure Eaſterly — — 3 17
Meridian Diſtance made in all 1 43 E.

R

A

JOURNAL

OF

A VOYAGE from ENGLAND

TOWARDS

MADERA.

H	K	H K	F.	Courſes	Winds	Lee-way	Tranſactions, *Thurſday May the 1ſt*, 1762.
2							
4							Moderate Gales and fair
6	The *Start* N. by E. diſt. 6 Leagues						Weather, at 6 (p. m.) the
8	4			SW*b*W	N E		*Start* bore as *per* Log, from
10	4	1					which I take my Depar-
12	5						ture, it being in the Lati-
2	5						tude 50 07 N. and Longi-
4	5	1		S W.			tude of 3 47 W. from *London*
6	5	1					
8	5	1					
10	5	1					
12	6						Variation 1 $\frac{1}{4}$ Point W.erly.

Courſe	Diſt.	S	W	Lat. by D. R.	Lat. by Ob.	Mer. Diſt.	Lon. made	Lon. in
S 30 00 W	108	93	53	48 34 N.		00 53 W	01 22 W	5 09 W

The Manner of working this Day's Work.

The oppoſite Point to the Bearing of the Land is S. by W. which with the Variation allow'd upon it (as before taught) make S. $\frac{1}{4}$ E. and the Diſtance from the Land 6 Leagues, or 18 Miles, which are to be ſet down for the firſt Courſe and Diſtance in the following Traverſe-Table.

Then the firſt Courſe ſteer'd being S.W. by W. the Variation allow'd upon it will make it S.W. by S. $\frac{3}{4}$ W. and the Sum of all the Diſtances from 8 a Clock where that Courſe begins, to 2 a Clock where it ends, being 18 Miles and a half, I double that Sum, (becauſe the Book is mark'd only for every Two Hours) and it makes 37 Miles for the Diſtance belonging to that Courſe. But if the Book had been mark'd for every Hour, as it is in the *Navy*, and Aboard the *Eaſt India* Ships, then I muſt have taken the Sum without doubling it for the Diſtance, and in the ſame manner I reckon the other Courſe and Diſtance; all which will be as in the following Traverſe-Table.

And then every Thing being found as on the other Side, I ſet them *down in their proper* Columns as above.

Courſe

The Traverſe Table.

Courſes	Diſt.	N.	S.	E.	W.
S ¼ E.	18		18.0	0.9	
SW. by S. ¾ W.	37		27.4		24.8
SSW. ¾ W.	56		48.0		28.8
Difference of Latitude S.			93.4	0.9	53.6
					0.9
					52.7 Dep. W.

The ſeveral Courſes and Diſtances in this Table, being look'd out and caſt up as in the Rules for Traverſe Sailing, (Page 52) I find my Difference of Latitude to be 93 Miles and 4 Tenths, and my Departure 52 Miles and 7 Tenths: Then I mark down (upon my Slate, or the Paper that I work upon) every Thing that is to be found, and as I find what they come to, I ſet againſt them as follows.

By D.R.
- Courſe —— S. 30 00 W
- Diſtance —— 108 Miles
- Diff. of Lat. —— 93 S.
- Departure —— 53 W.
- Lat. by D.R. —— 48 34 N.
- Lat. by Obſer.
- Meridian Diſtance 00 53 W.
- Longitude made — 01 22 W.
- Longitude in —— 05 09 W.

Becauſe the Diff. Lat. is S. and the Depar. W.

Note, When the Tenths in any Side are more than 5, or half a Mile, you muſt call that Side one Mile more than you found it to be; but when they are leſs than 5, then you need take no Notice of them. As in this Caſe the Diff. of Lat. being 93.4 I reject the 4 Tenths, and call it only 93 Miles, and the Dep. being 52.7, inſtead of the 7 Tenths I put one Mile to it, and call it 53 Miles.

But when you take the Difference of Latitude and Departure to find the Courſe by, then take them in Miles and Tenths.

Then in the firſt Place, with my Difference of Latitude 93.4, and my Departure 52,7 (as taught in Plane Sailing, *Caſe the 6th*) I find my Courſe to be 30 Degrees, and my Diſtance 108 Miles, which I ſet down againſt Courſe and Diſtance as above.

Second, For the Latitude by D.R.

Take the Latitude ſail'd from 50 07 N.
And the Diff. Lat. 93 Miles, or 1 33
Sub. (as *per* Rules) gives Lat. D.R. 48 34 N.

Third, For the Merid. Diſtance.

Note, The Meridian Diſtance on the firſt Day's Work, is always the ſame as that Day's Dep. which here is 0 53 W.

Fourth, For the Diff. of Long.

The Meridional Parts of The Lat. ſail'd from —— 3485
Of the Lat. by D.R. 3343
Meridional Difference of Lat. 142

Then I look for my Courſe 30 Degrees, in the Tables of Diff. of Lat. and Dep. and for the Merid. Diff. of Lat. 142, in ſome of the Diſt. of Lat. Columns belonging to that Courſe, the Dep. 82 which anſwers to that Diff. Lat. is my Diff. Long.

Fifth, For the Longitude made.

The Long. made on the firſt Day's Work, is always the ſame as that Day's Diff. of Long. which here is — 1 22 W.

Sixth, For the Longitude in.

Take the Longitude ſail'd from 3 47 W.
And the Diff. Lon. 82 Miles, or 1 22 W.
Sub. (as *per* Rules) gives Lon. in 5 09 W.

H	K	H K	F.	Courſes	Winds	Lee-way	Tranſactions, *Friday May the 2d*, 1762.
2	6			SWbyW.	N		
4	5	1					Moderate Gales and fair
6	5				NW		Weather, at 8 (a. m.) ſaw
8	5						a Ship to the Northward.
10	4	1		SW.			
12	4	1					
2	4	1					
4	4	1					
6	4	1					
8	5			SW.*b*S.	WNW		
10	4	1					Variation 1 $\frac{1}{4}$ Point W.erly.
12	4						

Courſe	Diſt.	S	W	Lat. by D. R.	Lat. by Ob.	Mer. Diſt.	Lon. made	Lon. in
S 33 00W	114	96	61	46 58 N.		1 54 W	2 55 W	6 42 W

The Variation being allow'd, and the Diſtances ſumm'd up as before, the Traverſe-Table will be as follows.

Courſe	Diſt.	N.	S.	E.	W.
SWbS $\frac{1}{2}$W	43		31.9		28.9
SSW $\frac{1}{2}$W	45		38.6		23.1
SbyW $\frac{1}{2}$W	27		25.4		9.1
Diff. of Lat. 95.9 Dep. 61.1					

Firſt, With my Difference of Latitude 95.9 and Departure 61.1 (by Plain-Sailing Caſe 6.) I find my Courſe to be 33 deg. and my Diſtance 114 Miles.

Second, For my Latitude by D. R.
Take the Latitude in yeſterday 48 34 N.
And my Diff. Lat. 96 Miles, or 1 36
Gives the Latitude by D.R. — 46 58 N.

Third, For the Meridian Diſtance,
Take the Mer. Diſt. yeſterday 0 53 W.
And the Departure to-day—— 1 01
Gives the Meridian Diſtance — 1 54 W.

By D. R.
Courſe —— S. 33 00 W.
Diſtance —— 114 Miles.
Diff. of Lat. —— 96 S.
Departure —— 61 W.
Latitude by D.R. 46 58 N.
Latitude Obſervation
Meridian Diſtance 1 54 W.
Longitude made— 2 55 W.
Longitude in —— 6 42 W.

Fourth, For the Diff. of Longitude.
Take the Mer. Parts of yeſt. Lat. — 3343
And of the Latitude to-day —— 3200
Gives the Mer. Diff. of Lat. —— 143
with which and the Courſe (as in the firſt Days Work) I find my Difference of Longitude to be 93 Miles.

Fifth, For the Longitude made.
Take the Long. made yeſterday 1 22 W.
And the Diff of Long. to-day 93 Miles, or —— 1 33
Gives the Long. made to-day 2 55 W.

Sixth, For the Longitude in,
Take the Long. in yeſterday 5 09 W.
And the Diff. of Long. to-day 1 33
Gives the Longitude in —— 6 42 W.

H.	K.	H	K	F.	Courſes	Winds	Lee-way	Tranſactions, *Saturday*, *May the 3d*, 1762.
2	4				S W	WNW		
4	4							Moderate Gales and
6	4							Cloudy.
8	4	1			S W b S	S W by N	½	
10	4	1						
12	4	1						
2	4	1			In 1ſt Reef both Top-ſails			
4	4				S S W	W	1	
6	4							
8	4							
10	4							Variation 1 Point W.erly.
12	4							

Courſe	Diſt.	S.	W	Lat. by D.R.	Lat. by Ob.	Mer. Diſt.	Lon. made	Lon. in
S 14 00 W	97	95	24	45 23 N		2 8 W	3 29 W	7 16 W

The Lee-way and Variation being allow'd as before taught, the Traverſe-Table will be as follows.

Courſe	Diſt.	N.	S.	E.	W.
S W by S	24		20.0		13.3
S b W ½ W	36		34.5		10.4
South	40		40.0		
			94.5		23.7

Firſt, The Courſe and Diſtance found (by Plain Sailing Caſe 6) as before, will be as in the other Column.

Second, For my Latitude by D. R.
Take the Latitude in yeſterday 46 58 N.
And the Diff. of Latitude 95 Miles, or — 1 35
Gives the Latitude by D.R. — 45 23 N.

Third, For the Meridian Diſtance,
Take the Mer. Diſt. yeſterday 1 54 W.
And the Departure to-day — 0 24
Gives the Meridian Diſtance — 2 18 W.

By D.R.
Courſe — S. 14 00 W.
Diſtance — 97 Miles
Diff. of Lat. — 95 S.
Departure — 24 W.
Lat. by D.R. — 45 23 N.
Latitude Obſerv.
Meridian Diſtance 2 18 W.
Longitude made - 3 29 W.
Longitude in — 7 16 W.

Fourth, For the Diff. of Longitude.
The Mer. Parts of yeſterdays Lat. — 3200
Of to-days Latitude — 3063
The Mer. Difference of Latitude — 137
with which and the Courſe (as before I find the Difference of Lon. to be 34 Miles.

Fifth, For the Longitude made.
Take the Long. made yeſterday 2 55 W.
And the Diff. of Long. to-day 0 34
Gives the Longitude made — 3 29 W.

Sixth, For the Longitude in,
Take the Longitude in yeſterday 6 42 W.
And the Difference of Longitude 0 34
Gives the Longitude in — 7 16 W.

The

T

H	K	H K	F.	Courſes	Winds	Lee-way.	Tranſactions, *Sunday May 4th*, 1762.
2	4			S	W S W	1	
4	4						Moderate Gales and Hazy
6	4	1					the firſt Part, the latter freſh
8	4			In 2d Reef both Topſails			Gales with Rain.
10	4			S S E	S W	1½	
12	4						
2	4						
4	4						
6	4			Handed the Fore-top-ſail			
8	4			S by E	SW byW	2	
10	4						
12	3	1			Tack'd		Variation 1 Point W.erly.

Courſe	Diſt.	S	E	Lat. by D. R.	Lat. byOb.	Mer. Diſt.	Lon. made	Lon in
S 39 00 E	93	72	60	44 11 N		1 18 W	2 07 W	5 54 W

The Ship having her Starboard Tacks aboard, when the Lee-way and Variation are allow'd (as before taught) the Traverſe-Table will ſtand as follows.

Courſes	Diſt.	N.	S.	E.	W.
S S E	33		30.5	12.6	
S E ½ E	40		25.4	30.9	
S E	23		16.3	16.3	
			72.2	59.8	

By D.R.

Courſe	S. 39 00 E.
Diſtance	93 Miles
Diff. of Lat.	72 S.
Departure	60 E.
Latitude by D.R.	44 11 N.
Lat. Obſervation	
MeridianDiſtance	1 18 W.
Longitude made	2 07 W.
Longitude in	5 54 W.

Having been very particular in explaining the manner of working a Days Work (in the three foregoing Days) and as all Days Works, where there is no Correction wanting, are to be work'd from the Difference of Latitude and Departnre found by the Traverſe Table (as before) I have here only ſet down the Traverſe Table, and what *all the other* Things come to, and have left the finding of them to *exerciſe the Learner.*

H

H	K	H K	F.	Courſes	Winds	Lee-way.	Tranſactions, *Monday May the 5th*, 1762.
2	4			NW by W	SW by W	2	Freſh Gales and Rain all theſe 24 Hours.
4	3						
6	3						
8	3			Hand	Main Top-ſail		
10	3						
12	3	1		NW	WSW	3	
2	3	1					
4	3	1					
6	3						
8	3						
10	3			NW by N	W by S	$3\frac{1}{2}$	Variation 1 Point W.erly.
12	3						

Courſe	Diſt.	N	W	Lat. by D. R.	Lat. by Ob.	Mer. Diſt.	Lon. made	Lon. in
N 29 00 W	75	65	36	45 16 N.		1 54 W	3 00 W	6 47 W

The Ship having her Larboard Tacks Aboard, when the Lee-way and Variation allow'd, the Traverſe Table will ſtand as follows.

Courſes	Diſt.	N.	S.	E.	W.
N W.	32	22.6			22.6
N N W.	33	30.5			12.6
N $\frac{1}{2}$ W.	12	11.9			1.2
		65.0			36.4

By D. R.

Courſe —— N. 29 00 W.
Diſtance —— 75 Miles.
Diff. of Lat. —— 65 N.
Departure —— 36 W.
Latitude by D.R. 45 16 N.
Latitude Obſervation
Meridian Diſtance 1 54 W.
Longitude made— 3 00 W.
Longitude in —— 6 47 W.

To find the Courſe.

Note, In this Caſe the Difference of Latitnde being juſt 65 Miles without any Tenths, after you have put two Cyphers to the Departure, you muſt not divide it by 65, but by 650, the Cyphers being put to ſupply the place of Tenths, as directed in the Rules for Plain-Sailing, ſee the Work.

Diff. Lat. 650) D. with Cyphers. 36400 (56 N.
3900 for Courſes

H	K	H K	F.	Courſes	Winds	Lee-way.	Tranſactions, *Tueſday May 6th*, 1762.
2	3			WNW	S W	3½	
4	3						Hard Gales and Squaly
6	3			Handed the Fore-ſail			with Rain.
8	Lay too, up NW. off N.					5	
10							
12	Drift 1 ½ Miles *per* Hour.						
2							
4				UpN by W. off NE by N			
6							
8							
10.				Up N NW. off N N E.			
12				Set the Fore-ſail.			Variation 1 Point W.erly.

Courſe	Diſt.	N	E	Lat. by D. R.	Lat. by Ob.	Mer. Diſt.	Lon. made	Lon. in
N 8 00 E	35	34	5	45 50 N		1 49 W	2 53 W	6 40 W

Having allow'd the Lee-way and the Variation upon the firſt Courſe, and alſo from the Middle between what ſhe comes up and falls off, (as taught in the Rules for Laying too,) the Traverſe-Table will ſtand as follows.

Courſes	Diſt.	N.	S.	E.	W.
NW by N ½ W	18	13.9			11.4
N N E	12	11.1		4.6	
N E by E	9	5.0		7.5	
N E	6	4.2		4.2	
		34.2		16.3	11.4
				11.4	
		Departure		4.9 E.	

By D.R.
- Courſe — N. 8 00 E.
- Diſtance — 35 Miles
- Diff. of Lat. — 34 N.
- Departure — 5 E.
- Lat. by D.R. — 45 50 N.
- Lat. by Obſer.
- Meridian Diſtance — 1 49 W.
- Longitude made — 2 53 W.
- Longitude in — 6 40 W.

H.	K.	H K	F.	Courſes	Winds	Lee-way.	Tranſactions, *Wedneſday May* 7th, 1762.
2	3			N W	W S W	4	
4	3						Freſh Gales the firſt Part,
6	3			W N W	S W	4	the latter Moderate, with
8	3			Set Main Top-ſail.			ſmall Showers.
10	3	1		N W	W S W	3	
12	3	1					
2	3	1		Set Fore Top-ſail.			
4	4			W by S	S by W	2	
6	4						
8	4						
10	4			Out 2d Reefs both Top-ſail			Variation 1 Point W.erly.
12	4	1		W	S S W	1½	

Courſe	Diſt.	N	W	Lat. by D.R.	Lat. by Ob.	Mer. Diſt.	Lon. made	Lon. in
N 54 00 W	72	42	58	46 32 N		2 47 W	4 17 W	8 04 W

Courſes	Diſt.	N.	S.	E.	W.
N. by W	12	11.8			2.3
NW by N	12	10.0			6.7
N N W	21	19.4			8.0
W	32				32.0
W b N ½ W	9	0.9			9.0
		42.1			58.0

By D. R.

Courſe — N.	54 00 W.
Diſtance —	72 Miles.
Diff. of Lat. —	42 N.
Departure —	58 W.
Latitude by D.R.	46 32 N.
Latitude Obſervation	
Meridian Diſtance	2 47 W.
Longitude made —	4 17 W.
Longitude in —	8 04 W.

H.	K.	H K	F.	Courſes	Winds	Lee-way	Tranſactions, *Thurſday*, *May the* 8th, 1762.
2	4	1		W by N	SW b S	1	
4	4	1					Moderate Gales and
6	4			Out 1ſt Reef both Top-ſails			thick Hazy Weather.
8	4	1		W	S S W	½	
10	4	1					
12	4	1					
2	4			W by S	S by W	½	
4	4						
6	4						
8	4						
10	3	1		W S W	S	½	Variation 1 Point W.erly.
12	3						

Courſe	Diſt.	S.	W	Lat. by D.R.	Lat. by Ob.	Mer. Diſt.	Lon. made	Lon. in
S 82 00 W	95	13	95	46 19 N		4 22 W	6 33 W	10 20 W

Courſes	Diſt.	N.	S.	E.	W.
W by N	26	5.1			25.5
W b S ½ W	27		2.6		26.9
W S W ½ W	32		9.3		30.6
S W by W ½ W	13		6.1		11.5
		5.1	18.0		94.5
			5.1		
Difference Latitude			12.9		

By D.R.

Courſe	S. 82 00 W.
Diſtance	95 Miles
Diff. of Lat.	13 S.
Departure	95 W.
Lat. by D.R.	46 19 N.
Latitude Obſerv.	
Meridian Diſtance	4 22 W.
Longitude made	6 33 W.
Longitude in	10 20 W.

H.	K.	H K	F.	Courſes	Winds	Lee-way.	Tranſactions, *Friday May* 9th, 1762.
2	2	1		WSW	S		Little Wind and ſmall Showers of Rain.
4	2	1					
6	2	1					
8	2						
10	2						
12	2						
2	1	1					A great Swell from the SW. for which I allow 6 Miles.
4	1	1		SW by W	S by E		
6	1	1					
8	1						
10		1					
12		1					Variation 1 Point W.erly.

Courſe	Diſt.	S	W	Lat. by D.R.	Lat. by Ob.	Mer. Diſt.	Lon. made	Lon. in
S 57 00W	34	19	29	46 00 N		4 51 W	7 15 W	11 2 W

Courſes	Diſt.	N.	S.	E.	W.
SW by W	30		16.7		24.9
S W	10		7.1		7.1
N E by N	6	5.0		3.3	
		5.0	23.8	3.3	32.0
			5.0		3.3
			18.8		28.7

By D.R.
- Courſe —— S. 57 00W.
- Diſtance —— 34 Miles
- Diff. of Lat. —— 19 S.
- Departure —— 29 W.
- Lat. by D.R. —— 46 00 N.
- Lat. by Obſervation
- Meridian Diſtance 4 51 W.
- Longitude made 7 15 W.
- Longitude in —— 11 02 W.

Note, In this Days Work the Swell coming from the SW. heaves the Ship towards the NE. and the Variation allowed upon it makes NE. by N. for the laſt Courſe in the Traverſe Table.

H	K	H K	F.	Courſes	Winds	Lee-way	Tranſactions, *Saturday May the 10th*, 1762.
2				Calm			
4							Tried the Current and found it to ſet W S W. 1 Mile *per* Hour, at which Rate I allow it for this 24 Hours.
6							
8							
10							
12							
2							
4							Zenith Diſtance 27 52 S.
6							Declination—— 17 41 N.
8	1			S S W.	W		
10	2						Variation 1 Point W.erly.
12	2	1					

Courſe	Diſt.	S	W	Lat. by D. R.	Lat. by Ob.	Mer. Diſt.	Lon. made	Lon. in
S 42 00 W	32	24	22	45 36 N.	45 33 N	5 13 W	7 50 W	11 37 W

Courſes	Diſt.	N.	S.	E.	W.
S by W	11		10.8		2.1
SW*b*W	24		13.3		20.0
			24.1		22.1

Courſe —— S. 42 00 W.
Diſtance —— 32 Miles
Diff. of Latitude— 24 S.
Departure —— 22 W.
Latitude by D.R. 45 36 N.
Latitude Obſerv.— 45 33 N.
Meridian Diſtance 5 13 W.
Longitude made— 7 50 W.
Longitude in —— 11 37 W.

Note, The Current ſetting W.S.W. 1 Mile *per* Hour, I allow the Variation upon it, which makes it SW. by W. and ſet it in the Traverſe Table, with 24 Miles Diſtance, as above.

H.	K.	H	K	F.	Courſes	Winds	Lee-way	Tranſactions, *Sunday*, *May the* 11th, 1762.
2	3				S by W	W by S		
4	3	1						Moderate Gales and fair
6	4							Weather, at 9 (a. m.) ſpoke
8	4							with a Ship from *Barbadoes*,
10	4							and bound for *London*.
12	4							
2	4							
4	4							
6	4							
8	4							
10	4							
12	4							Variation 1 Point W.erly.

Courſe	Diſt.	S.	—	Lat. by D.R.	Lat. by Ob.	Mer. Diſt.	Lon. made	Lon. in
South	103	103	—	44 00 N	43 50 N	5 13 W	7 50 W	11 37 W

By D.R. ſince laſt Obſer.

Courſe	South
Diſtance	93 Miles
Diff. of Lat.	93
Departure	00
Lat. by D.R.	44 00 N.
Latitude Obſerv.	43 50 N.

Corrected.

Courſe	South
Diſtance	103 Miles
Diff. of Lat.	103 S.
Departure	00
Lat. by D.R.	44 00 N.
Lat. by Obſervation	43 50 N.
Meridian Diſtance	5 13 W.
Longitude made	7 50 W.
Longitude in	11 37 W.

In this Day's Work, there being 10 Miles Difference between the Latitude by Dead-Reckoning and Obſervation, I am to Correct, and therefore I do not find the Meridian Diſtance, *&c.* by (D.R.) as I did when there was no Correction; but I mark them all down again as above, and Correcting (as in Caſe the Firſt, of the Rules for Correcting) becauſe my Courſe by D.R. ſince the laſt Obſervarion was due South, I ſet them all down, as in the above Correction.

H	K	H K	F.	Courſes	Winds	Lee-way.	Tranſactions, *Wedneſday May the 14th*, 1762.
2	4			W.	S E		
4	4						Cloudy the firſt part, the
6	4						latter Moderate and Fair.
8	4						
10	4				E		
12	4						
2	4						
4	4						
6	4						
8	3	1					
10	3	1					
12	3	1			N N E		Variation ½ Point W.erly.

Courſe	Diſt.	—	W	Lat. by D. R.	Lat. by Ob.	Mer. Diſt.	Lon. made	Lon. in
Weſt	93	—	93	41 02 N.	41 11 N	8 18 W	11 56 W	15 43 W

Courſes	Diſt.	N.	S.	E.	W.
WbyS ½ W	93		9.1		92.6
			Diff. Lat.		Dep

Corrected by Caſe the 4th, the Courſe by D. R. being more than 6 Points.

By D.R. ſince laſt Obſer.
- Courſe — W. by S. ½ W.
- Diſtance — 93 Miles.
- Difference of Lat. 9 S.
- Departure — 93 W.
- Latitude by D.R. - 41 02 N.
- Latitude Obſer. — 41 11 N.

Corrected.
- Courſe — Weſt
- Diſtance — 93 Miles
- Diff. of Lat. — 00
- Departure — 93 W.
- Latitude by D.R. 41 02 N.
- Lat. Obſervation 41 11 N.
- Meridian Diſtance 8 18 W.
- Longitude made 11 56 W.
- Longitude in — 15 43 W.

Note, When the Courſe is due Eaſt or due Weſt, as in this Caſe, then this Difference of Longitude cannot be found by the Courſe, and Meridional Difference of Latitude as before, but muſt be found as follows; look in the Tables of Difference of Latitude and Departure, for the neareſt Degree to your Latitude, which here is 41, and in ſome of the Difference of Latitude Columns belonging to that Degree find your Departure, which in this Caſe is 93, the Diſtance anſwering to that which is 123, gives your Difference of Longitude.

H.	K.	H K	F.	Courſes	Winds	Lee-way.	Tranſactions, *Thurſday May* 15th, 1762.
2	4			S by W	N		
4	3	1					Little Wind and Hazy
6	3	1					all theſe 24 Hours.
8	3						
10	3			S S W	N W		
12	3						
2	3						
4	3						
6	3			S b W ½ W	W N W		
8	3						
10	3						
12	3						Variation ½ Point W.erly.

Courſe	Diſt.	S	W	Lat. by D.R.	Lat. by Ob.	Mer. Diſt.	Lon. made	Lon. in
S 11 00 W	76	74	14	39 57 N		8 32 W	12 15 W	16 02 W

Courſes	Diſt.	N.	S.	E.	W.
S ⅛ W	28		27.9		2.7
S b W ½ W	24		23.0		7.0
S by W	24		23.5		4.7
			74.4		14.4

By D.R.

Courſe —— S. 11 00 W.
Diſtance —— 76 Miles.
Diff. of Lat. —— 74 S.
Departure —— 14 W.
Latitude by D.R. 39 57 N.
Latitude Obſervation.
Meridian Diſtance 8 32 W.
Longitude made — 12 15 W.
Longitude in —— 16 02 W.

Note, Having in the foregoing Day's Work given an Example to every Caſe of correcting, (for a ſingle Day) I ſhall now ſet down two or three Days Work by D. R. and then ſhew how to correct them all together by an Obſervation, that is, how to correct for a longer Time than one Day.

H	K	H K	F.	Courſes	Winds	Lee-way.	Tranſactions, *Friday May 16th*, 1762.
2	3	1		S S W	W by N		Little Wind and Cloudy.
4	3	1					
6	4						
8	4						
10	4			S by W	W		
12	3	1					
2	3	1					
4	3	1					
6	3			S	W S W		
8	3						
10	3			S b W ½ W	W		Variation ¼ Point W.erly.
12	3	1					

Courſe	Diſt.	S	W	Lat. by D. R.	Lat. by Ob.	Mer. Diſt.	Lon. made	Lon. in
S 12 00 W	83	82	17	38 35 N		8 49 W	12 38 W	16 25 W

Courſes	Diſt.	N.	S.	E.	W.
S b W ¾ W	30		28.2		10.1
S ¾ W	29		28.7		4.3
S ¼ E	12		12.0	0.6	
S b W ¼ W	13		12.6		3.2
			81.5	0.6	17.6
					0.6
				Dep.	17.0

By D.R.

- Courſe —— S. 12 00 W.
- Diſtance —— 83 Miles.
- Diff. of Lat. —— 82 S.
- Departure —— 17 W.
- Latitude by D.R. 38 35 N.
- Latitude Obſervation
- Meridian Diſtance 8 49 W.
- Longitude made — 12 38 W.
- Longitude in —— 16 25 W.

H.	K.	H K	F.	Courſes	Winds	Lee-way.	Tranſactions, *Saturday May* 17th, 1762.
2	3	1		S bW ¼ W	W byN		Little Wind and fair Weather.
4	3	1					
6	3	1					
8	3						
10	3	1					
12	3						
2	3						
4	2			S by W	W		
6	3						
8	3						
10	3						
12	3						Variation ¼ Point W.erly.

Courſe	Diſt.	S	W	Lat. by D.R.	Lat. by Ob.	Mer. Diſt.	Lon. made	Lon. in
S 14 00W	74	72	17	37 23 N		9 06W	13 1W	16 48W

Courſes	Diſt.	N.	S.	E.	W.
S by W ½ W	46		44.0		13.3
S ¾ W	28		27.7		4.1
			71.7		17.4

By D.R.

Courſe	S. 14 00 W.
Diſtance	74 Miles
Diff. of Lat.	72 S.
Departure	17 W.
Lat. by D.R.	37 23 N.
Latitude Obſerv.	
Meridian Diſtance	9 06 W.
Longitude made	13 01 W.
Longitude in	16 48 W.

H	K	H K	F.	Courſes	Winds	Lee-way.	Tranſactions, *Sunday May 18th*, 1762.
2	4			S by W	W by N		
4	4						Moderate Gales and Fair
6	4						
8	4						
10	4						
12	4						
2	4			S b W ¼ W			
4	4						
6	4						
8	4						
10	4						
12	4						Variation ¼ Point W.erly.

Courſe	Diſt.	S	W	Lat. by D. R.	Lat. by Ob.	Mer. Diſt.	Lon. made	Lon. in
S 9 00W	108	107	17	35 48 N	35 36 N	9 23 W	13 19W	17 06W

Courſes	Diſt.	N.	S.	E.	W.
S ¾ W	48		47.5		7.0
S by W	48		47.1		9.4
			94.6		16.4

By D.R. ſince yeſterday Noon.
- Courſe —— S. 10 00 W.
- Diſtance —— 96 Miles
- Diff. of Lat. — 95 S.
- Departure —— 16 W.
- Latitude D. R. 35 48 N.
- Latitude Obſer. 35 36 N.

Now being to correct from the laſt Obſervation, which was on *Wedneſday*, *May* 14th, I take the Northing, Southing, Eaſting and Weſting for every Day ſince, and bring them into a Traverſe Table as follows,

By D.R. ſince the laſt Obſervation.

	N.	S.	E.	W.
On *Thurſday*, *May* 15		74		14
On *Friday* the 16		82		17
On *Saturday* the 17		72		17
On this Day as above		95		16

Whole Diff. of Lat. by D.R. S. 323 Dep. 64 W.

Gives Courſe by D.R. ſince laſt Obſerv. S. 11 00 W.

My

My Courſe found by D. R. ſince the laſt Obſervation, being S. 11 00 W. which is leſs than 33 Degrees, I am to correct by Caſe the 2d, and to find every thing except the Diſtance, as follows.

Firſt, *For the True Difference of Latitude.*

Take the Latitude laſt Obſervation —— —— 41 11 N.
And the Latitude by Obſervation To-day —— 35 36 N.
Gives the Difference of Latitude —— —— 5 35
Which multplied by 60, makes —— —— 335 Miles.

Second, *For the True Courſe.*

The Courſe by D.R. ſince the laſt Obſervation, being S. 11 00 W. I ſet it down for the true Courſe, as *per* Rule in Caſe 2d.

Third, *For the True Departure.*

With the true Courſe 11 Degrees, and the True Difference of Latitude (divided by 2, becauſe too big to be found in the Tables) which makes it 167.5, (by *Plain Sailing*, Caſe the 2d) I find the Departure 32.6 which multiplied by the ſame Number the Difference of Latitude was divided by, *viz.* 2, gives 65.2 Tenths for the true Departure.

Fourth, *For the Meridian Diſtance.*

Take the Meridian Diſtance laſt Obſervatin —— 8 18 W.
And the True Departure —— —— —— —— 1 05
Gives the Meridian Diſtance To-day —— —— 9 23 W.

Fifth, *For the Difference of Longitude.*

Take the Meridional Parts of laſt Obſervation —— 2716
And Meridional Parts of To-days Obſervation —— 2288
Gives Meridional Difference of Latitude —— —— 428
With the Half of which —— —— —— —— 214
(becauſe the whole is too big to be found in the Tables) and the True Courſe 11 Degrees, I find the Difference of Longitude 41.6, which doubled becauſe the other was halv'd, gives for the whole Difference of Longitude 83 Miles.

Sixth, *For the Longitude made.*

Take the Longitude made laſt Obſervation	11	56 W.
And the whole Difference of Longitude	1	23
Gives the Longitude made	13	19 W.

Seventh, *For the Longitude in.*

Take the Longitude in laſt Obſervation	15	43 W.
And the whole Difference of Longitude	1	23
Gives the Longitude in	17	06 W.

	Courſe — S. 11 00 W.	these to be found again as follows.	S. 9	00 W.
	Diſtance		108	Miles
	Difference of Latitude — 335 S.		107	S.
	Departure — 65 W.		17	W.
Corrected	Latitude by D.R. — 35 48 N.			
	Latitude by Obſervation 35 36 N.			
	Meridian Diſtance — 9 23 W.			
	Longitude made — 13 19 W.			
	Longitude in — 17 06 W.			

The Courſe, Difference of Latitude and Departure as above, being what has been made ſince the laſt Obſervation, (which was 4 Days ago) and as it is uſual to ſet them down only as they are made from Noon to Noon, therefore they are to be rubb'd out, and found again as follows.

Firſt, Take the Latitude by D.R. Yeſterday	37	23 N.
And the Latitude by Obſervation To-day	35	36 N.
Gives the Difference of Latitude	1	47

Second, Take the Meridian Diſtance Yeſterday	9	06 W.
And the Meridian Diſtance To-day	9	23 W.
Gives the Departure	0	17

Then with the Difference of Latitude 107, and the Departure 17 Miles, (by *Plain Sailing*, Caſe 6.) I find the Courſe to be 9 Degrees, Diſtance 108 Miles as above.

H.	K.	H K	F.	Courſes	Winds	Lee-way.	Tranſactions, *Monday May* 19th, 1762.
2	5			S by W	N		By Reckoning I make my Courſe from the *Start* to the Iſland of *Madera*, S. 32 00 W. Diſtance 420 Leagues, Meridian Diſtanc and Difference of Longitude as underneath.
4	6						
6	6	1					
8	7						
10	7	1					
12	8						
2	8						
4	8						
6	8	1					At Noon ſaw the Iſland of *Madera*, bearing S.W. by W. Diſtance 14 Leag. Variation 00.
8	8	1					
10	9						
12	9						

Courſe	Diſt.	S	W	Lat. by D.R.	Lat. by Ob.	Mer. Diſt.	Lon. made	Lon. in
S 19 00 W	213	202	70	13 14 N		10 33 W	14 43 W	18 30 W

Courſes	Diſt.	N.	S.	E.	W.
S by W	182		178.5		35.5
SW b W	42		23.3		34.9
			201.8		70.4

The Bearing of the Land being SW. by W. diſtant 14 Leagues, or 42 Miles, I ſet them in the Traverſe Table as a Courſe, *&c.*

Courſe —— S. 19 00 W.
Diſtance —— 213 Miles
Diff. of Latitude 202 S.
Departure —— 70 W.
Latitude by D.R. 32 14 N.
Meridian Diſtance 10 33 W.
Longitude made 14 43 W.
Longitude in — 18 30 W.

It being Cuſtomary upon making the Land, to find what Courſe and Diſtance the Ship has made by Reckoning from the Place ſail'd from, to the Place arrived at, it is to be done as follows.

CASE the Firſt, *When you keep the Account in Longitude in,*

With the Latitude and Longitude of the Place you ſail'd from and the Latitude and Longitude you are in by your Reckoning, on the Day you make the Land, find the proper Difference of Latitude, the Meridional Difference of Latitude, and the Difference of Longitude in Miles, and with them find the Courſe and Diſtance (as it is ſhewn at large in Mercator's Sailing) Caſe the Firſt, Page 55.

CASE the Second, *When you keep the Account of Longitude made.*

Then the proper Difference of Latitude, and the Meridional Difference of Latitude, are to be found as before, and the Difference of Longitude is to be found by bringing the Longitude made into Miles, with which proceed as in Caſe the Firſt.

The Agreement between theſe two Ways may be ſeen as follows.

On the 19th of *May*, when I made the Land, my Longitude in was ——— 18 30 W.
Longitude of the *Start*, or Place I ſail'd from 3 47 E.
The Diff. of Longit. 14 43
Which multiplied by — 60
Makes ——— 883 Miles

On the ſame Day my Longitude made was —— 14 43 W.
Which multiplied by — 60
Makes the Diff. of Lon. 883 Miles the ſame as in the other Caſe.

To find the Bearing and Diſtance of any Place from the Ship, upon any given Day.

Example. Suppoſe I would know how *Madera* bore off me, and what Diſtance on the 14th of *May*, by the foregoing Journal.

Firſt, Suppoſing I kept only the Account of Longitude in,

Then, with the Latitude in	41 11 N.	2716	And with Lon. in — 15 43 W.
And the Latitude of *Madera*	32 44 N.	2080	And the Lon. *Madera* 17 26 W.
I find the proper Diff. of Lat.	8 27	636	I find the Diff. Lon. 1 43
Which multiplied by 60 makes Miles.	507	M.D.L	Which makes —— 103 Miles.

Then with that Meridional Difference of Latitude, and Difference of Longitude, I find the Courſe to be S. 09 00 W. and the Diſtance 510 Miles, (as in *Mercator* Caſe 1.)

But if I had kept only the Account of Longitude made, (which is Difference of Longitude) Then,

With the Longitude ſail'd from ——— 3 47 W.
And the Whole Diff. of Lon. or Lon. made — 11 56 W.erly
By the Rules for Longitude (Page 107) I ſhould have found the Lon. in to be ——— 15 43 W.

And then I have given the Latitude and Longitude in, *&c.* as before.

I have in the foregoing Journal ſhewn how to Correct either for a ſingle Day, or for a longer Time, and given Examples of every *Caſe, for correcting* from one Obſervation to another; but as it may *happen that you* may be ſome Days at Sea, from the Time of your leaving

leaving the Land before you have an Obſervation, and that when you get that firſt Obſervation you may have Occaſion to Correct, (and there being much the ſame Difference between working the Correction from one Obſervation to another; and between the firſt Obſervation and the Land, as there is between working the firſt Days Work and any of the following ones) I ſhall here give an Example from the foregoing Journal.

To Correct from the Time of leaving the Land, to the Firſt Obſervation.

Example. Suppoſe that in the foregoing Journal, on the 3d of *May*, I was by Obſervation in the Latitude 45 10 N. my Latitude by D.R. being 45 23 N. my Southing by D.R. 95, and Weſting 24.

Now being to correct, and having no Obſervation before To-day, I muſt correct from the very Beginning of my Journal, that is, from the Time of my leaving the Land, by bringing the Northing, Southing, Eaſting and Weſting, (for every Day I have been at Sea) into a Traverſe-Table as follows.

		N.	S.	E.	W.
By D. R. from the Time of leaving the Land	On the firſt Day.		93		53
	On the ſecond Day.		96		61
	On the Day I Correct.		95		24
	Whole Diff. of Lat. by D.R. S. 284 Dep. 138 W.				

Gives the Courſe by D.R. from the Time of leaving the Land S. 26 00 W.

The Courſe found by D. R. from the Time of leaving the Land, being leſs than 33 Degrees, I am to correct by Caſe the Second, and to find every thing except the Diſtance, as follows.

First, *For the true Difference of Latitude.*

Take the Latitude of the Place ſail'd from 50 07 N.
And the Latitude in by Obſervation —— 45 10 N.
Gives the true Difference of Latitude —— 4 57 or 297 Miles

Second, *For the true Courſe.*

The Courſe by D. R. ſince the Time of leaving the Land being S. 26 00 W. I ſet it down for the true Courſe, as *per* the Rules for correcting, Caſe 2d.

Third,

Third, *For the True Departure.*

With the true Courſe 26 Degrees, and half the True Difference of Latitude 148.5, (becauſe the whole is too big to be found in the Tables) by *Plain Sailing*, Caſe the 2d. I find the Departure 72,3, which being doubled (becauſe the Difference of Latitude was halv'd) gives 144.6 for the true Departure.

Fourth, *For the Meridian Diſtance.*

Whenever you Correct from the Time of your leaving the Land, (as you do here) the Meridian Diſtance will always be the ſame as the True Departure found by Correcting, which in this Caſe is 145 Miles, or 2 25 W.

Fifth, *For the Difference of Longitude.*

Take the Meridional Parts of the Latitude ſail'd from 3485
And of the Latitude in by Obſervation — — — — 3044
Gives the Meridional Difference of Latitude — — — 441
With the half of which — — — — — — — — 220,5

(becauſe the whole is too big to be found in the Tables) and the True Courſe 26 Degrees, (as directed in the Firſt Day's Work, p. 134) I find the Difference of Longitude 107.4. which doubled (becauſe the other was halv'd) gives the true Difference of Longitude 214,8.

Sixth, *For the Longitude made.*

Whenever you Correct from the Time of your leaving the Land, (as you do in this Caſe) then the Longitude made will always be the ſame as the whole Difference of Longitude found by the Correction, which in this Caſe is 215 Miles, or 3 35 W.

Seventh, *For the Longitude in.*

Take the Longitude of the Place you ſail'd from — 3 47 W.
And the whole Difference of Longitude — — — 3 35
Gives the Longitude in — — — — — 7 22 W.

Corrected	Courſe	S. 26 00 W.	theſe to be found again	S. 16 00 W.
	Diſtance			113 Miles
	Difference of Latitude	297 S.		108 S.
	Departure	145 W.		31 W.
	Latitude by D. R.	45 23 N.		
	Latitude by Obſervation	45 10 N.		
	Meridian Diſtance	2 25 W.		
	Longitude made	3 35 W.		
	Longitude in	7 22 W.		

The Courſe, Difference of Latitude and Departure as above, being what has *been made in the whole*, from the Time of leaving the Land (which is three Days)

Days) and as it is uſual to ſet them down only as they are made from Noon to Noon, therefore they are to be rubb'd out, and found again as follows.

Firſt, Take the Latitude by D.R. Yeſterday	46 58	N.
And the Latitude by Obſervation To-day	45 10	N.
Gives the Difference of Latitude	1 48	

Second, Take the Meridian Diſtance Yeſterday	1 54	W.
And the Meridian Diſtance To-day	2 25	W.
Gives the Departure	0 31	

Then with the Difference of Latitude 108, and the Departure 31 Miles, (by *Plain-Sailing*, Caſe 6,) I find the Courſe to be S. 16 00 W. Diſtance 113 Miles, as above.

Having in the preceeding Journal ſhewn how to find what Latitude and Longitude the Ship is in, on any Day, I ſhall in the next place ſhew how,

By that Latitude and Longitude in, to prick off the Place of the Ship on the Mercator's Chart.

Rule. Lay a Ruler a-croſs the Chart, in the Latitude your Ship is in, then look upon the Equinoctial, or Lines marked with the Degrees of Longitude, for the Longitude your Ship is in by your Reckoning, and ſetting one Foot of your Compaſſes in that Longitude, take the neareſt Diſtance to ſome North and South Line, and from where that Line croſſes the Edge of the Ruler that lays in the given Latitude, lay off that ſame Diſtance (by the Edge of the Ruler) to the Right-hand, if the Longitude you are in was to the Right-hand of the North and South Line: Or to the Left-hand if it was to the Left, where this falls will be the Place of the Ship. But this will only do when the Longitude mark'd on the Chart and your Reckoning of Longitude in, are both counted from the ſame Meridian, therefore for a general Rule take the following, *viz.*

By the Latitude in, and Longitude made, to prick off the Ship's Place, &c.

Rule, Set one Foot of your Compaſſes in the Place you take your Departure from, and take the neareſt Diſtance to ſome North and South Line, and from where that Line falls upon the Equinoctial, or Line mark'd with the Degrees of Longitude, ſet off that Diſtance, the ſame way as the Place lays from it, (that is to the Right-hand, if the Place lay to the Right-hand of the North and South Line, or to the Left-hand if it lay to the Left) and make a mark with a Black Lead Pencil; this Mark will ſerve to prick off by, till you come to take a New Departure, and then you rub it out and make a New one, as before.

Then, lay a Ruler a-croſs the Chart in the Latitude you are in, and taking ſo many Degrees in your Compaſſes (from the Line of Longitudes) as your Longitude made comes to, ſet them off from your Black Lead Mark, to the Eaſtward, if the Longitude made be Eaſt, or to the Weſtward if it be Weſt;

where

where this falls will be the Longitude the Ship is in by the Chart, from which take the neareſt Diſtance to ſome North and South Line, and from where that Line, &c. as in the firſt Caſe.

The Ship's Place on the Chart being found as before taught; it remains in the next Place to ſhew how to find the Bearing and Diſtance of any Place from the Ship; and Firſt,

To find how any Place bears from the Ship.

Rule. Lay a Ruler from the Place of the Ship, to the Place you would know the Bearing of, then ſet one Foot of your Compaſs in the Center of ſome Compaſs near the Ruler, and take the neareſt Diſtance to the Edge of the Ruler; then run one Foot of your Compaſſes along by the Edge of the Ruler, and obſerve what Point of the Compaſs the other comes neareſt to, which will be the Bearing required.

To find the Diſtance of any Place from the Ship.

Caſe the 1ſt, If the Place be in the ſame Longitude that the Ship is in, (that is, if it bears due North or due South) then the Difference of Latitude between them (found as by the Rules for Latitude, Page 105) and turn'd into Miles or Leagues will be the Diſtance.

Caſe the 2d, If the Place be in the ſame Latitude that the Ship is in, (that is, if it bears due Eaſt or due Weſt) then take half the Diſtance between the Ship and the Place, in your Compaſſes, and ſetting one Foot (on the Line mark'd with the Degrees of Latitude) in the Latitude the Ship is in, ſee what Latitudes the other Foot will reach to, both above and below it; the Difference between theſe two Latitudes, (found as *per* Rules for Latitude) will be the Diſtance required.

Caſe the 3d, If the Place be neither in the ſame Latitude nor Longitude with the Ship, then take the Difference of Latitude between them in Degrees, from the Equinoctial-line, and laying a Ruler from the Ship to the Place, apply one Foot of the Compaſſes ſo to the Edge of the Ruler, that the other Foot turn'd about may juſt touch ſome Eaſt and Weſt Line, that is croſs'd by the Ruler, then take the Diſtance along the Edge of the Ruler, from the Place where the Compaſſes reſted, to the Place where the Ruler croſſes the ſaid Eaſt and Weſt Line; that Diſtance meaſured on the Equinoctial, or Degrees of Longitude, will give the Diſtance in Degrees, which you may turn into Miles or Leagues, and in the ſame manner as you find the Bearing and Diſtance of any Place from the Ship; you may alſo find the Bearing and Diſtance of one Place from another.

F I N I S.